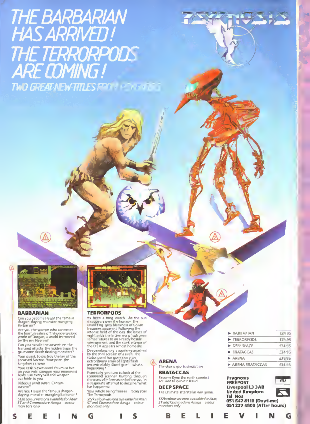
YOUR
COMMODORE
AN ARGUS SPECIALIST PUBLICATION
OCTOBER 1987 £1.10

GUIDE TO COMPUTER COMMUNICATIONS

● BOTHERSOME BASIC – BEGINNERS START HERE ● REBOUND – SUPERB C16, PLUS/4 GAME ● ADVENTURE KIT-DIY ADVENTURING



THE BARBARIAN HAS ARRIVED!

THE TERRORPODS ARE COMING!

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BARBARIAN

Can you become Hegor the famous dragon slaying monster mangling Barbarian?

Are you the warrior who can enter the fearful realms of the underground world of Durgan, a world terrorized by the evil Necron?

Can you handle the adventure the frenzied attacks the hidden traps the gruesome death dealing monsters?

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Hideous perils await Can you survive?

Are you Hegor the famous dragon-slaying, monster mangling Barbarian?

512k colour versions available for Atari ST and Commodore Amiga colour monitors only

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It's been a long watch As the sun disappears over the horizon the unnerving grey bleakness of Colian becomes apparent Following the intense heat of the day the onset of night adds the bitterness of sub zero temperatures to an already hostile environment and the stark interior of the D SV appears almost homelike

Deep melancholy is suddenly smashed by the shrill scream of a siren The status panel has gone crazy an extraordinary array of lights flash uncontrollably Good grief what's happening?

Frantically you turn to look at the command scanner hunting through the mass of information before you in a desperate attempt to decipher what has happened

Your whole being freezes It can't be! The Terrorpods

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ARENA

The classic sports simulation

BRATACCAS

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The ultimate interstellar war game.

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SEEING IS BELIEVING

VOLUME 4 NUMBER 1

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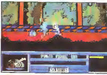

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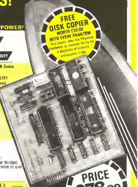
THE PARALLEL DISK TURBO SYSTEM EVERY 1541 WANTS!

THE NEW! PHANTOM

NOW WITH ADDED POWER!



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DATA STATEMENTS

Electronic Arts in the UK

Electronic Arts, one of the top US entertainment software companies have announced their plans to launch a U K subsidiary, and are looking for new talent We are looking to support U K software artists designing high quality software' comments Mark Lewis, Director of European publishing We are in discussions with a number of software developers and are happy to talk to those who believe they can offer creativity and quality programming '

Touchline
***Electronic Arts Ltd.** Langley Business Centre 11 49 Station Road Langley Nr Slough Berkshire SL3 8YN **Tel** 0753 49442*

What Book to Buy

Following the success of the 'What range of computer books H & D Services have decided to go national with their second volume A major factor in the marketing of the books is that they will be sold only through independent retailers This provides a natural link with United Software Distribution Ltd (U S D) who will be presenting the book to major independent computer retailers in the U K

U S D 's Managing Director Andy Wood commented, 'these publications help the consumers gain more understanding of the software that they buy The books also prolong the longevity of software and they help solve some of the queries that haunt consumers retailers and software houses alike

The 'What' range are available only from computer retailers and include 'What Now?' which is a handbook for adventurers packed with hints maps and solutions Also 'What Poke which comprises hints maps and pokes for arcade type games

Touchline
***H & D Services** 1338 Ashton Old Road Higher Openshaw Manchester M11 1JG **Tel** 061-370 5666*

Shades for 'Free'

All Micronet members are now eligible for five hours free play on *Shades* the multi-user adventure game Shadists (as Shades players like to be known!) can use their five hours anyway they want – in one block of five hours for one person or spread out in smaller blocks The offer stands for all Micronet members regardless of whether they've played before or not

Touchline
***Micronet** Telemap Ltd Durrant House 8 Herbal Hill London EC1R 5EJ **Tel.** 01-278 3143*

Computer MIDI in Action at Show

One of the big crowd pullers at the forthcoming PCW show will probably be Electromusic Research (EMR) with their live computer-controlled music demonstration EMR's range of computer MIDI software and hardware covers most home and business 8/16/32-bit micros and new recording, sampling and scorewriting products will be on display The special offers will include an EMR recording system which connects MIDI-keyboard and computer for £69

So follow the sound of music, and you're assured of an entertaining time, not to mention the odd bargain or two

Touchline
***Electromusic Research (EMR) Ltd.** 14 Mount Close Wickford Sussex SS11 8HG **Tel.** 0702 335747*

New Labels

Go! is a new high profile and performance software brand from U S Gold which claims to release six major software products between now and December Although Go! products will dovetail into certain sales marketing and distribution policies of U S Gold, they will operate in the main as a separate company in terms of advertising activities and European distribution

DATA STATEMENTS

Go! hope to link up with Captain America of Marvel Comics and Lazer Tag from Worlds of Wonder, the best selling toy in the United States. Also in production is the home computer version of the blockbusting Masters of the Universe film.

U.S. Gold's Tim Chaney believes in the success of Go! and comments 'we are very confident that three years experience as brand leaders in the European software marketplace puts us in the pole position to successfully launch a new brand.'

Following the success of *Barbarian*, Palace have now launched a new software label – Outlaw Productions. Mathew Tims, previously general manager of Palace Software, will head the new operation, which will run alongside Palace. Mathew comments 'there are now a number of highly skilled and professional development teams in existence. Our aim is to help them produce their best work and to market it using the skills and knowledge we have picked up over the last three years.'

The first release on the new label will be a *Shoot 'em Up Construction Kit* for the C64. It has been developed by Jonathan Hare and Christopher Yates of Sensible Software, who with their understanding of the C64 have developed a system, which will enable a person with no programming knowledge to write the sort of games that would have cost £10.

From left: Jonathan Hare, Matthew Tims and Christopher Yates

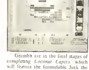
Touchline.

Go! Ltd. *Unit [illegible] Holford Way Birmingham B6 7AX Tel 021-356 3388*

Palace Software Ltd *275 Pentonville Road London N1 9NL Tel 01-278 0751*

Arcade Action

Alligata Software have released *Addictaball*, a game for the C64 priced at £6.95 on disk. An addictive game of shooting, scrolling, protecting, planning and humour which demands razor sharp reflexes.

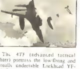


Gremlin are in the final stages of completing *Coconut Capers* which will feature the formidable Jack the Nipper. The game is set in the jungle where the tranquility is broken by the arrival of Jack, who jumps from a plane using his nappy as a parachute. His father however is in hot pursuit and Jack being Jack gets up to mischief with a tropical flavour in his efforts to avoid being caught and given a spanking. Jack discovers the cocounts are a useful form of defence against the natives and true to form tries to be as naughty as possible. A special surprise awaits Jack as he reaches 100% on the Naughtyometer but only playing the game will reveal it!

Coconut Capers will be available for £14.99 on disk for the Commodore.

Rebel is the latest 'Gang of Five' game from Virgin. You play worker THX 2240, forced to work in an agriculture factory of the future. However you can take no more and steal a tank from the Crowd Control Vehicle armoury. Then you must escape by diverting the solar energy normally used to enhance crop growth. You need to collect and arrange solar reflectors to reflect the beam and blast your way through the levels and make your final escape. *Rebel* is available on cassette for C64/128 and costs £9.95.

Digital Integration will be launching three new titles this autumn. *F 16 Combat Pilot* is a game which involves using a complex payload of avionics to search, locate and destroy targets. Control a variety of modern weaponry including AIM sidewinder and AMRAAN missiles, AGM Maverick, laser guided bombs and 30mm cannon to survive and win.



The *ATF* (advanced tactical fighter) portrays the low flying and virtually undectable Lockhead YF-22A. Pick up intelligence information, chose a variety of targets and test your mind and dexterity in a hostile world.

With *Bobsleigh* choose your equipment and back-up support

within constraints of sponsorship funds, and get the true feeling of speed as you compete on World Cup and Olympic tracks. All games are available for the C64.

Touchline

Alligata Software Ltd *1 Orange Street Sheffield S1 4DW* ***Tel.*** *0742 755796*

Gremlin *Alpha House 10 Carver Street Sheffield S1 4PS* ***Tel*** *0742 753423*

Virgin *2-4 Vernon Yard Portobello Road London W11 2DX* ***Tel*** *01 727 8070*

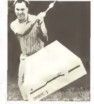
Digital Integration Ltd *Watchmoor Trade Centre Watchmoor Road Camberley Surrey GU15 3AE* ***Tel.*** *0276 684044/684959*

Hardware Update

Now is the time for registered Commodore users to buy a colour monitor for their Amiga. Commodore Business Machines (UK) Ltd are offering £100 off either the Amiga 500 or A1081 colour monitor and £200 off the pair through vouchers which have been mailed to all registered Commodore users. Commodore dealers have also been notified and a window sticker will signify their participation. There's no time to waste – the offer closes on September 12th.

An upgraded version of the Excelerator disk drive is now available for the C64 from Evesham Micros, who believe it is now the most compatible disk drive on the market. It is selling for £159 and following early production difficulties it is now fully available from the foreign manufacturers.

The effects of exposure to noise in a computerised environment are often underestimated and printers in particular should be acoustically shielded to minimise sound levels. Kareware have recently produced a Soundshield which is aimed at the dot matrix or compact display wheel printer, which can reduce noise levels by 15 decibels. The unit is lined with fire resistant foam and features a tinted reinforced glass lid. The price ranges from £89.50 to £109.50, with additional options available such as a sheet feeder attachment and stand and a plug-in fan.



The upgraded Excelerator disk drive

In addition to the Amiga 500, C128 and C64, Commodore's distributors have now been given control over the PC10, PC20 and PC40/20. The distributors are Tomorrow's World in Belfast and Dublin, Lightning Distribution in London, Hugh Symmons in Bournemouth and ZCL (Zappo) Holdings in Staffordshire. The new prices for complete systems with a mono monitor are £699 for the PC10, £999 for the PC20 and £1599 for the PC 40/20. Tom Hart, Commodore's (UK) national sales manager believes that "the move into the consumer marketplace with those quality engineered products dramatically strengthens the range of Commodore products available to the consumer".

Following successful sales, Star Micronics U.K. Ltd have cut prices of their two most popular dot matrix printers. The price of the NL-10 which is a nine-pin printer offering 12 characters per second (cps) in draft mode and 30 cps in near letter quality has dropped by over ten per cent and is now available for £248 (which includes parallel interface). At the other end of the scale the NB-15 which provides an incredible 300 cps in draft output and laser like letter printing at 100 cps has dropped in price to £849.

In a bid to provide a compact and effective solution to desk-top printing requirements, Viglen have produced a range of printer stands at prices ranging from £9.95 to £29.95. The stands are ideal for use with most 80 or 136 column PC printers and allow for up to 1,000 sheets of continuous stationery to be stored underneath.

Touchline

Commodore Business Machines (UK) Ltd *Commodore House The Switchback Gardner Road Maidenhead Berks SL6 7XA* ***Tel*** *0628 770088*

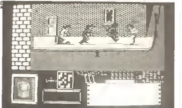
Evesham Micros *63 Bridge Street Evesham Worcs WR11 4SF* ***Tel*** *0386 41989*

KAI Computer Services Ltd Kareware *Unit 1 7 Cubitt Street London WC1* ***Tel.*** *01-608 0081*

Viglen *Unit 7 Trumpers Way Hanwell London W7 2QA* ***Tel*** *01-843 9903*

Star Micronics UK Ltd *Craven House 40 Uxbridge Road Ealing London W5 2BS* ***Tel.*** *01 840 1800*

D A T A



Fight to Win

Gremlin have released a war game which puts the responsibility of the future of the country in your hands What a position to be in! In *Convoy Raider* war has been declared and the enemy is closing in and your mission is to patrol and defend the inner sea using all modern weapon systems which includes the Seawolf a deadly accurate missile the Exocet a video-linked rocket and an anti-submarine helicopter *Convoy Raider* will be available for the C64/128 on disk at £14 99

Touchline

***Gremlin** Alpha House 10 Carver Street Sheffield S1 4FS **Tel** 0742 753423*

Adventure Time

The MicroProse/Origin partnership have come up with a new concept in fantasy role-playing in *Moebius* Available on the C64 disk and priced at £19 95, it comes complete with manual and oriental headband

The aim of the game is to retrieve the Celestial Orb or Harmony which has been stolen from Moebius The game play is set in four different planes – each having different variables and ever-changing obstacles to overcome At each level challenges increase demanding greater courage and cunning use of martial arts swordsmanship and the wise use of sophisticated magic systems is essential to overcome an array of opponents ranging from tigers to assassins

Gremlin have snapped up the computer software rights to the Charles Bronson film Death Wish and have been busy adapting the film to the small screen to create *Death Wish III* Available on the Commodore 64/128 the adventure follows the fortunes of Paul Kersey (Charles Bronson) as the justice-fighter who's out to rid New York of the punks and creeps who infect the streets Kerseys weapons include a 475 Wildey Magnum a pump action shotgun a machine gun and a rocket launcher His greatest ally is his belief that the face of decent New York citizens is in his hands alone the driving force behind all the violence and bloodshed is Kersey's Death Wish

Meet *Captain Courageous* the latest recruit from English Software Follow his adventures through hair raising jungle combat journeys up treacherous rivers dangerous descents and lethal rockfalls quick-fire snipper attacks, dramatic gun-fights across high level bridges and the final rescue bid and helicopter snatch *Captain Courageous* is available on the Commodore 64/128 at £8 95 for cassette and £12 95 on disk

Touchline.

Microprose Software Ltd 2 Market Place Tetbury Gloucestershire GL8 8DA ***Tel*** 0666 54326

***Gremlin** Alpha House 10 Carver Street Sheffield S1 4FS **Tel** 0742 753423*

***English Software** 1 North Parade Parsonage Gardens Manchester M3 2NH **Tel** 061 835 1358*

The PCW Show is in Town

The Personal Computer World Show is with us once more and after ten years is still the industry's most comprehensive exhibition for business This year's show which is being held at Olympia is being run from Wednesday 23rd to Sunday 27th September and as in previous years the first two days will be reserved for trade and business visitors The show will open from 10am until 7pm except on Sunday when it will close at 5pm

Greater emphasis will be focused on the business visitor this year and the business hall in Olympia Two will boast industry experts in addition to some major product and company launches

Other attractions will include a desktop publishing stand (DTP) which will give visitors the chance to see how copies of the Daily Show News are produced The editorial staff will also be at hand to offer advice and opinions of the fast growing DTP industry

The Open University will be returning with regular video presentations on expert systems in British industry and image processing and one to one consultations will be possible between viewings

One of the more exotic attractions at the show will be a chance to win a holiday for two in Thailand The 14-day holiday which is worth £2 500 can be won by simply entering a draw – so make level two one of your first stops

Tickets are available at £3 each from the Keith Prowse ticket agency (01-741 9999) or at the door

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Commodore User

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Superbase 128	~~£90.95~~	£49.95
Superscript 128 & Superbase 128	~~£180.90~~	£49.95
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Commodore DPS 1101
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STAR NL10 Dot Matrix Printer — Print Speed 120 cps in Draft Mode and 30 cps in Near Letter Quality Mode. Friction and Tractor Feed. 5K Buffer. Automatic Single Sheet Paper Set. Front Mode Select Panel

Commodore version (with CBM 64/128 Printer Lead)	£229.95
Centronics version (with Amiga Printer Lead)	£235.95
Optional Cut Sheet Feeder	£63.95

1541 C DISC DRIVE	£195.95
1571 DISC DRIVE	£249.95

Both the above include either:
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6 Infocom Disc Adventure Games, or
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2-colour Dot Matrix Printer takes 2¼in. roll paper ~~£49.95~~ £29.95

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Fully Commodore compatible	£195.95
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Commodore 1901 Colour Monitor	£299.95
Philips 64/128 Green Screen Monitor	£89.95
Commodore 1541 C Disc Drive	£189.95
Commodore 128D	£399.95
Commodore MPS 1000 CBM/Centronics Printer	£229.95
Commodore 128 Computer	£199.95

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COMPOSER/EDITOR SOFTWARE For Music Expansion System, Tape or Disc	£24.95
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ACTION REPLAY Mk III Tape to Disc Back up Cartridge	£29.95
NEOS MOUSE WITH CHEESE SOFTWARE, Tape or Disc	£24.95
COMMODORE C2N DATA RECORDER	£29.95
TROJAN CADMASTER LIGHT PEN	
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Combat Simulations

The following games are a selection from the growing band of simulations that pack a punch, and aren't just therapy for retired pilots suffering withdrawal symptoms

By Tony Hetherington

If your idea of simulation is pressing 43 keys to lift a plane off the ground, only to circle around for half an hour before crashing while attempting to land, then take a back seat as Combat Simulations puts you firmly in the thick of the action. You take command (and often the controls) of a war machine with a mission and a not just a sight seeing tour and you must strike first before the enemy turns you into scrap metal.

Inflight entertainment is for those who like their excitement without their feet on the ground and includes bombing raids in World War II, 100 missions for an Apache helicopter Gunship and futuristic fights for the SkyFox. Surface tension takes to the high seas and on patrol in a Destroyer unit, finally we plunge into deep trouble and dive! dive! dive! into submarine action.

Inflight Entertainment

Flight simulators were slow to take off with programmes that were difficult to use and were little more than sight seeing tours leaving the player to devise more and more spectacular ways of crashing. Flight simulators needed more action. These high flyers have plenty of action packed into dogfights and bombing raids and are as different as the aircraft they simulate.

B24

In this latest combat flyer you take control of not only one plane but a full squadron of 40 B24's in bombing raids on the oil refineries of Ploesti, Rumania. Your mission is to knock out the oil supply for Hitler's war machines. The real B24 squadron that was given this task started with 60 aircraft and were left with only four after flying 50 missions. You have only 40 bombers and 19 missions to knock out 12 targets.

With a mission that's tough you're going to need some practice and so two other targets are included and so you train as you bomb Mostar in Yugoslavia (just over the Adriatic Sea from your base in Spinazzola, Italy) and the heavily guarded Rumanian city of Bucharest. Survive these training missions with your squadron intact and you're ready for the main event.

To help you plan your assaults the game disk or tape is accompanied by a map of your targets and possible routes, an intelligence report on Ploesti and an instruction booklet that includes a step by step guide through the Mostar mission.

The first step of a mission is to take off and circle at about 2000ft as the other planes slot into formation. Then you must rendezvous with your fighter escort, precede to the target and start your bombing run. The effectiveness of your run is increased if you're flying at the correct height and speed for your bomb load and deliver it on the target. Once you've done this you should get out of the area as quickly as possible and get your squadron back to base with as many planes as possible fit and fueled for the next mission.

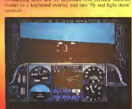
B24 is one of SSI's superb strategy games and despite its crude graphics it's a fantastic game to play. It was designed by two bomber pilots so you can be sure it's accurate, and you can speed up real time to fly past the long flights to and from the target. The game assumes that Squadron Leaders know how to fly a plane and leave you with minimal controls but plenty to do as you plan rendezvous routes with fighter escorts, bomb targets and return to base while coping with damage to your own aircraft. One mission down, 18 to go and you've already lost four aircraft and another six need repair!

Touchline.
***Title** B24 **Supplier** US Gold/SSI Unit 2/3 Holford Way Holford Birmingham B6 7AX **Tel** 021 356 3388 **Machine** C64 **Price.** £19.95 (d) £14.95 (c) **Originality** 7/10 **Graphics** 4/10 **Playability** 7/10 **Value** 7/10*

Gunship

A former Game of the Month (May '87) Gunship took flight simulators to new heights and its players on 100 missions that range from the training field of the USA to the battlefields of the world.

The Apache helicopter gunship is remarkably easy to fly considering there are 31 keyboard and joystick controls thanks to a keyboard overlay and two 'fly and fight them' tutorials.



When you've graduated from the training fields you're ready for your first sortie in South East Asia. After an intelligence report and mission details of your primary and secondary targets you must arm your Apache with a balance of 30mm cannon ammo, Hellfire missiles, Ffar rockets and Sidewinder air to air missiles. The exact nature of your weapons is decided by the mission you're on and the enemy forces that you're expecting. Cannon fire is good at close range but you'll also need some Ffar rockets to take out infantry and gun emplacements where as Hellfire missiles are needed for armoured targets such as tanks and bunkers leaving the Sidewinder to greet enemy Hind helicopters.

As you travel the globe from Asia to the Middle East, Central America and Europe you'll be challenged by more powerful and better equipped enemies and will need all your electronic counter measures, flares and chaffs to stay in the air long enough to complete your mission.

Succesful missions will earn you points, medals and even promotions until eventually you'll retire as a heavily decorated Colonel.

Gunship is a massive 100 mission 3D flight simulation where the sky is the limit for the pilot skilled in combat flying.

Touchline
***Title** Gunship **Supplier** Microprose 2 Market Place, Tetbury Gloucestershire GL8 8DA **Tel:** 0666 54326 **Machine** C64 **Price** £19.95 (d) £14.95 (c) **Originality:** 9/10 **Graphics** 8/10 **Playability** 10/10 **Value** 10/10*

Aces of Aces

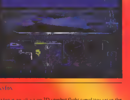
The Moquito fighter bomber flew a variety of missions during World War II and now it's your turn to take the controls as you try to become the Ace of Aces.

The game begins in the briefing room as the C.O. outlines the tasks ahead to destroy the U-boats as they leave their base, shoot down incoming bombers, deflect V-1 rockets and destroy a POW train but not the cars containing the prisoners. These missions can be tackled individually but to become the Ace of Aces you will have to tackle them all in a single sortie.

To fly the mission, you will have to master the controls on five screens that show your left and right wings and engines, bomb bay and weapon selector, operations map and forward view from which you must fly the plane and shoot down enemy aircraft.

Ace of Aces owes a lot to an earlier Artech game based on the Dambusters but features more options, missions and a lot more action.

Touchline
***Title** Ace of Aces **Supplier** US Gold (Artech) Unit 2/3 Holford Way Holford Birmingham B6 7AX **Tel** 021-356 3388 **Machine** C64 **Price.** £9.95 **Originality.** 7/10 **Graphics** 7/10 **Playability** 9/10 **Value** 8/10*



Skyfox

Skyfox is an all action 3D combat flight simulator set in the near future where you must battle an alien invasion force of tanks, planes and motherships. The scenarios range from training missions to all out invasions that have descriptive names such as the Alamo, Massive Onslaught and Cornered.

The screen display shows the cockpit of your Skyfox Phantom showing the radar scanner to plot the position of the enemy shield fuel and speed indicators as well as your view of the battlefield You can punch up a computer screen which will plot your position as well as those of the enemy tanks planes and motherships. Your first target must be the motherships as these can launch squadrons of tanks to destroy your installations Lose these and you lose your chance to refuel and rearm You can then choose whether to [illegible] on the tanks at ground level or zoom up above the cloud [illegible] to dogfight with the enemy aircraft

[illegible] great game which was one of Ariolasoft's greatest hits [illegible] get a new lease of life as Electronic Arts set up [illegible]

Touchline
[illegible] ***Supplier*** *Electronic Arts Angler Business [illegible] Station Road Langley Nr Slough Berks SL3 [illegible]* ***Tel:*** *(0753) 49442* ***Machine*** *C64* ***Originality*** *7/10* ***Graphics*** *9/10* ***Playability*** *9/10* ***Value*** *8/10*

Here's a duo of destroyer action in which you must protect the free world from air sea and underwater attack in Convoy Raider and Captain your ship in seven different Destroyer missions ranging from a Subhunt to Convoy Escort

Convoy Raider

In Gremlin's Convoy Raider your mission is to patrol the Inland Sea and attack and destroy any enemy planes ships or aircraft that you find Finding them isn't a problem as they'll find you even if you don't leave your port Surviving is the skill

The action is controlled from five [illegible] accessed from a radar screen with three [illegible] displays showing the presence of any enemy [illegible] the surface or underwater If a blip shows [illegible] you must go the appropriate [illegible] anti aircraft sea wall must [illegible] or incoming [illegible] must [illegible] destroy submarines [illegible] knock out enemy shipping [illegible] must pilot [illegible] around the Inland Sea using the map screen [illegible] state of your ship from the [illegible]

The action is fast and [illegible] the standards of the other [illegible]

Touchline
Title *Convoy Raider* ***Supplier*** *Gremlin Graphics Alpha House 10 Carver Street Sheffield S1 4FS* ***Tel*** *0742 753423* ***Machine*** *C64* ***Price*** *£9.99(c) £14.99(d)* ***Originality*** *5/10* ***Graphics*** *5/10* ***Playability*** *7/10* ***Value*** *5/10*

Destroyer

Can you man 13 stations on a Fletcher class Destroyer, all at the same time? Can you also use these stations to complete one of seven missions on the high seas? You will [illegible] this and more as you take the helm in Epyx's Destroyer. As well as the radar sonar navigation bridge [illegible] deck forward and aft guns port and starboard [illegible] guns port and starboard torpedo tubes, depth charges and damage control stations! You move between the stations by typing in two letter codes such as BR for bridge and after a few seconds you're faced with a new set of controls Most controls are self-explanatory such as aiming guns or torpedoes before firing or setting the depth charges to a bracket of depths for a better chance of taking out a submarine

In the controlled panic of a full mission you will need all your skill and strategy to ensure that you get your shot in first and that it counts as you can't afford long battles with a single enemy ship when you've got a convoy to protect and damage control crews to assign a course to plot and so on An excellent multi screen simulation

Touchline
Title *Destroyer* ***Supplier*** *US Gold/Epyx Unit 2/3 Holford Way Holford Birmingham B6 7AX* ***Tel*** *021-356 3388* ***Machine*** *C64* ***Price*** *£9.95*
Originality *7/10* ***Graphics*** *9/10* ***Playability*** *9/10* ***Value*** *9/10*

DEPTH 1
DEPTH 2
DEPTH
DEPTH

[illegible] submarine as it [illegible] underwater [illegible] strike at the heart [illegible] has always [illegible] for a game Until now C64 submariners [illegible] for the Silent Service Now they can also [illegible] Up Periscope and will soon be able to dive [illegible] marine version of Epyx's Destroyer

Up Periscope

Illinois based ActionSoft have produced one of the best simulations you're ever likely to play as you take to the depths in a World War II fleet class submarine.

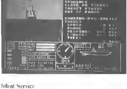
The screen display is split into three sections. A strip across the top of the screen shows the command options available and highlights those selected. Below that a 3D view displays what you can see from either the conning tower or the periscope and below that is an instrument panel showing your bearing, depth, speed, power, torpedos left and every other dial or reading you'll need to find your targets and sink them.

If you select the charts to plot your position or the radar to search for enemy destroyers or perhaps the torpedo data computer to lock on target then the 3D view will swap to a split-screen display with the instrument occupying the right hand side and the important part of the 3D view on the left. The result works extremely well either in a practice mode or on patrol in the Pacific.

The graphics are quite exceptional and are the result of ActionSoft using Sublogic's 3D routines pioneered in its flight simulator.

A copy of this game arrived in the *Your Commodore* office in an unmarked pack and it took some time to track down where you could get it. There isn't a UK version of it yet so if you want a copy of the game disk, instruction book and tactics manual you'll have to get an imported copy from Strategic Plus Software.

Touchline
Title *Up Periscope* ***Supplier*** *Action Soft/Strategic Plus Software P O Box 8 Hampton Middx TW12 3XA* ***Tel*** *01 979 2987* ***Machine*** *C64* ***Price*** *£30*



Silent Service

Silent Service was the first submarine simulation to reach these shores courtesy of US Gold.

Once the game has loaded and the scenario selected the program displays the bridge with you standing by the periscope. If you press the button you can see through the scope (if you're not below periscope depth) but you can also move the joystick to go up to the conning tower to fire the deck gun, to the map table to plot a route and to the instruments to change course. Once selected the screen changes to show the relevant display.

As in Up Periscope you can put your submariner skills to the test in a series of scenarios and war patrols in which your targets will be tankers and troop ships and your enemy the

destroyers. To add to your problems you can include a selection of reality factors such as poor visability, zigzagging convoys, dud torpedos and the worrying expert destroyers.

Silent Service is the easier submarine game to play but Up Periscope will provide a better campaign game. You may even get promoted.

Touchline
Title *Silent Service* ***Supplier*** *Microprose 2 Market Place Tetbury Gloucestershire GL8 8DA* ***Tel*** *0666 54326*
Machine *C64* ***Price*** *£9.95*
Originality *7/10* ***Graphics*** *8/10* ***Playability*** *8/10* ***Value*** *9/10*

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Bothersome Basic

Given up on Basic or never got started? It does have its uses – and it is worth having a second go, so follow this series.

By Eric Doyle

For several years now Basic has been courted struggled with and ultimately ignored by countless thousands of would-be programmers The main problem is that there are very few training courses specifically aimed at the Commodore 64 home user I was myself involved with an enterprise aimed at bringing Basic to the masses through intensive weekend courses One message was clear it is not easy to learn from manuals alone and most people require clear concise instruction to help them understand the whys and wherefores of specific programming problems

Having just alerted the Editor to the apparent futility of this series I'd better quickly explain my Basic philosophy!

This series will deal with all aspects of Basic for the beginner the crest-fallen and the persistent keyboard basher If you find you don't understand any area that we cover during future months pick up your pen and write to me If a routine in one of your programs refuses to respond to gentle persuasion let me know Before I disappear under a flood of white envelopes I will say now that I can't promise to have enough hours in a week to answer all of your individual problems but I do promise to give all the help I can but only if you follow the instructions at the end of this article

Each month the article will deal with a simple programming technique followed by a deeper dive into the workings of the computer which may be too advanced for those just wishing to write some useful routines but which will provide the key to a fuller understanding of computers for those who wish to progress to machine code routines later on

Essential Attitude

A good attitude to take towards your computer is to think of it as a foreigner with a limited command of English The first reaction a confused tourist will experience is the natural assumption that they're as thick as two short planks and as deaf as a post In most cases this is not really a fair attitude but with a computer nothing could be nearer the truth If you don't believe me think of all the times the machine has refused to perform the simplest of tasks without fault and consider why we have to use CAPITAL LETTERS!

Presumably you will all have read the erudite and definitive training given in the Commodore manual and despite this handicap have nevertheless gleaned a few of the very basic commands available to you I will assume that you can now successfully PRINT messages on the screen and that you will also have sussed the fact that programs consist of numbered lines of instructions which the computer slavishly reads and obeys unquestioningly A simple program would look like this

```
10 PRINT "DON'T PANIC"
```

Type RUN and the words DON'T PANIC appear on the screen All very comforting but not exactly useful

We can get the computer to do something fractionally more thrilling by using a device known as a loop This causes the program to madly repeat the program over and over again The simplest way to do this is to add the line

```
20 RUN
```

All this does is to get the program to re-run time and again and despite the comforting message it will induce extreme panic in the beginner when the wretched machine refuses to stop Don't reach for the power switch simply press the key marked RUN/STOP on the extreme left of the keyboard and the computer will take a break until you type in RUN again

Believe it or not one of the most common faults at this level of programming is to forget to press the RETURN key when typing in the program If your computer isn't behaving properly type LIST (remember to press RETURN) and the contents of the program memory will be revealed

Now that you're fully equipped with a way to drive computer salesmen up the wall with eternally repeating rude messages at your local computer store let me say that he will not be impressed with your programming style! Far better to substitute line 20 with

```
20 GOTO 10
```

This simply tells the computer to loop back and repeat line 10 ad nauseam or until the RUN/STOP key is pressed

Once again we have produced a program with very little practical application except for hi-tech vandals who make the saleman's life a misery of continual vigilance

To Usefully Go (To)

Before we see how the GOTO command can be used in a sensible way we have one more kind of loop to consider which introduces a basic concept used by all programs the variable

Type NEW press RETURN and you will clear the computer s memory ready for a new program If you try LIST at this point the computer will simply respond with the word READY so type the following program in

```
10 FOR A=1 TO 10
20 PRINT  DON T PANIC
30 NEXT A
40 PRINT  FINISHED
```

Run the program and you will find the phrase printed just ten times on the screen To explain this miraculous phenomenon concentrate on line 10

The letter A is known as a variable The best way to imagine this is to think of the computer as a stack of boxes We have asked the computer to mark one of these boxes with a big letter A in which it will store anything we say that A is equal to You may now think that we've told the computer that A=1 but what about the TO 10 bit? The main thing about a variable is that it can be varied! We ve told the computer that A will vary between 1 and 10 The computer translates this as meaning that A will have a value of one at the beginning of the program so it stores that value in the box labelled A

The program then runs to line 20 and prints the message Then when line 30 is translated the computer checks back to where A=1 TO 10 was encountered and loops back to that line Now the clever part occurs Checking the contents of box A the computer finds that it still contains a one Having been told that A will vary between 1 and 10 it increases the content of the box by one so that A now contains the value two Line 20 is obeyed and NEXT A is encountered again so it loops back to line 10 Once more the content of box A is increased by one to three and the whole process is repeated until A has a value of ten

When A is increased the computer checks to see if that number is greater than ten We have now reached the point where A=10 and is incremented to eleven this is bigger than ten and so the program jumps to the line after the NEXT A command and FINISHED is printed on the screen

How can we prove that this happens? First of all type PRINT A and press RETURN The value eleven is printed on the screen Hmm it seems plausible but we need proof

Semi Differences

Let s try something different LIST 20 move the cursor to the end of line 20 and type in a semi-colon Press return and LIST the program Masterfully the computer should have inserted the altered line in its correct place in the program

```
10 FOR A=1 TO 10
20 PRINT  DON T PANIC"
30 NEXT A
40PRINT 'FINISHED
```

Change line 40 to read PRINT A and run the program This time the message is printed ten times across the screen with 11 printed at the end The semi colon tells the computer that the next PRINT statement will continue from where the last print statement leaves off Alter line 40 to

```
40 PRINTA PRINT 'FINISHED'
```

Re-run and you ll see that the number 11 is now printed on a separate line We have ended the semi-colons dictatorial reign As you can see more than one command can be written on a program line as long as you separate the commands by a colon NEW the program and type this in

```
10  FOR  A=1  TO  10 PRINT  A
 DON T PANIC"  NEXT A ? A
```

Don t worry about the question mark in line 10 just type in the line as printed here and run the new program

This time the messages are preceded by a number which is the current value of A List the program and you ll find that the question mark has changed to the word PRINT The computer has a built-in shorthand

Command	Abbreviation
ABS	aB
AND	aN
ASC	aS
ATN	aT
CHR$	cH
CLOSE	clO
CLR	cL
CMD	cM
CONT	cO
COS	cos
DATA	dA
DEF	dE
DIM	dI
END	eN
EXP	eX
FN	fn
FOR	fO
FRE	fR
GET	gE
GET#	get#
GOSUB	goS
GOTO	gO
IF	iF
INPUT	input
INPUT#	iN
INT	int
LEFT$	leF
LEN	len
LET	lE
LIST	lI
LOAD	lO
LOG	log
MID$	mI
NEW	new
NEXT	nE
NOT	nO
ON	on
OPEN	oP
OR	or
PEEK	pE
POKE	pO
POS	pos
PRINT	?
PRINT#	pR
READ	rE
REM	rem
RESTORE	reS
RETURN	reT
RIGHT$	rI
RND	rN
RUN	rU
SAVE	sA
SGN	sG
SIN	sI
SPC(	sP
SQR	sQ
STEP	stE
STOP	sT
STR$	stR
SYS	sY
TAB(	tA
TAN	tan
THEN	tH
USR	uS
VAL	vA
VERIFY	vE
WAIT	wA

which can save space and time. You may have encountered listings which have lines that the computer refuses to accept because they stretch beyond two lines of text on the screen. This is known as the logical line length which, logically, is the maximum length of a line and equals 80 characters or in other words two screen lines.

We'll come back to this later so store it at the back of your mind in a box marked 'Don't Forget'.

Nine Times?

Let's put our loop to some serious work. A computer is more than a sophisticated adding machine but it can be used to best effect for calculations. Let's construct a program which produces the nine times table. We could do this in the long winded way which would repeat lines such as

```
10PRINT 2 × 9 = ' 2*9
20? 3 × 9 =  3*9
```

and so on but using a loop simplifies all this typing

```
10 FOR A=2 TO 12
20 ?A " × 9 = " A*9
30 NEXT
```

You'll notice that I've failed to type A after NEXT in line 30 preferring to let the computer decide which variable we're currently using. This variable's name is not particularly helpful when you come back to look at the listing in ten years time so why not use the computer's ability to understand longer variable names. It could easily be called NUMBER instead of A but you must change the name in each line where is appears.

We can run two loops at the same time by placing one inside the other

```
10 FOR MULTIPLIER=2 TO 12
20 FOR NUMBER=2 TO 12
30 ?NUMBER " × " MULTIPLIER"
= NUMBER * MULTIPLIER
40 NEXT NU,MU
```

Running this program causes the computer to put up the full set of tables from two to 12 but it all goes too quickly for any practical purpose.

You'll also notice that I've only used the first two letters of each variables name in the NEXT statement. The name of a variable is a bit of a con because the computer only labels the relevant boxes with the first two letters of the variable's name. When naming variables you must always remember this because the computer would treat variables called MULTIPLIER and MULTIPLICAND as the single variable MU and chaos would result.

Loops Within Loops

You'll also have seen that I've gone back to naming the variables after the NEXT statement. When more than one variable is used it's safer to do things this way but make sure that the variables are named in the correct order. The computer will not accept loops which are not properly nested inside one another. In other words the following is acceptable

```
10 FOR A=1 TO 10
20 FOR B=1 TO 5



120 NEXT B,A
```

But in the following, the loops are not nested loops and would cause problems

```
10 FOR A=1 TO 10
20 FOR B=1 TO 5



120 NEXT A,B
```

Meanwhile, back in our program there is one way to make it easier to see the times tables by adding the following line

```
40 NEXT NU
50 FOR DELAY=1 TO 250:NEXT
60 NEXT MU
```

Now the program pauses between each table printout. Line 50 simply makes the computer count to 250 before continuing. Try varying the value and see what happens.

Know Your Shorthand

Before I pull the plug on this week's beginner's course let's go back to the computer shorthand.

Apart from the question mark for PRINT, most of the other keywords can be shortened by using the first one or two letters of the keyword followed by the next letter Shifted. The best way to see this is to switch the computer into lower case mode by holding down the Shift key and pressing the Commodore key once.

Type in the following

```
10 ?pO nE rU reT
```

List the program and you'll find the keywords revealed in full. A full list of abreviations can be found near the back of your Commodore manual but I included it here to show the number of command keywords at your service.

The Deep End

The following line extends beyond the logical line on the screen. Try entering it as printed here and see what happens when you press RETURN

```
10PRINT "THIS WOULD NOT
FIT INTO ONE PROGRAM LINE
FOR A=1TO 10 POKE1024+A,0
NEXT ? BYE
```

Next switch to lower case and enter the line as follows

```
10 ? this would not fit into one
program line' fO a=1to19 pO102+a
0 nE ? 'bye '
```

This time the line goes into memory. List it and it does the impossible by stretching over three screen lines. Why?

To understand this phenomenon you have to realise that every character in a program line is stored as a separate number in consecutive memory locations. Keywords are stored as a single number no matter how long their real name is. PRINT is stored in memory as the value 153 but in a statement such as

```
PRINT "PRINT YOUR NAME
```

the first PRINT would be stored as a single byte of value 153 but the second PRINT in the quotation marks would be stored as a string of ASCII codes for the relevant letters 80 82 73 78 and 84. If it were possible to poke a line directly into memory you could feasibly enter almost 40 keywords on one line!

Send your problems to Eric Doyle, Bothersome Basic, Your Commodore, ASP Ltd, 1 Golden Square, London W1R 3AB enclosing any relevant printouts or listing recordings relating to your query. I'm afraid that I cannot answer queries by phone under any circumstances.

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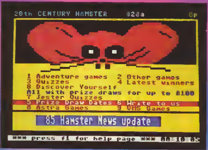
AO39

Computer Communications

[illegible] fashionable at the moment but can [illegible] confusing to the novice. We take an in-depth look at what communications are and why they are needed.



```
20th CENTURY HAMSTER     928a        0p
1 Adventure games   2 Other games
3 Quizzes           4 Latest winners
8 Discover Yourself
All with prize draws for up to £100
7 Jester Quizzes
5 Prize Draw Dates  6 Write to us
8 Astra Games       9 VHS Games
   85 Hamster News Update
*** press f1 for help page *** 08-10 85
```

We all know and understand what is meant by human communications, but computer communications are different, or are they? They are different because a computer is a machine which cannot think but which is programmable and more importantly we can get to the inside of a computer whereas we cannot connect a lead from one person's brain to another! A computer and a person are similar in the way that data (ideas or words) is sent from one machine and received and interpreted by another. This is thus [illegible] reason for why the two computers want to communicate.

The answer is simple: we want them to. We want to send the information which is available through them. In a large company, perhaps using different systems, information may need to be transferred from one computer to another within the same building; a telephone line is not necessary but a fast rate of transfer (baud rate, explained later) is.

On the other hand, to transfer data between different offices or between your home and a computer miles away necessitates the use of a telephone line (except in a specialised field where data is transmitted via satellite). A telephone line limits the rate of transfer which can can take place.

[illegible]

[illegible] to connect your c[illegible]er to [illegible] line, there are two essen[illegible] [illegible] need.

[illegible] of all, your phone line must [illegible] Jack type sockets. This [illegible]w you to plug in your [illegible]ering machine or modem [illegible]d course that th[illegible] [illegible]our phone or item th[illegible] [illegible]n is fitted with a little [illegible]

[illegible]u need a modem. The [illegible] an abbreviation of the [illegible]lator DEModulator. [illegible] computer understands [illegible]ame as those which go [illegible] telephone line and therefore a translation process is necessary at both the sending and receiving ends. This translation process is carried out by the modem.

Also the software used depends on the modem you use and the purpose for which it is to be put. Some modems come with software either in them (in ROM) or on disk with them, others require you to purchase the software separately.

Which Modem?

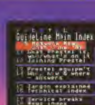
Before [illegible] can be answered you have [illegible] what services you want [illegible] your computer in other [illegible] to decide what you [illegible] you have it [illegible]er like buying an [illegible] have to decide [illegible] [illegible]ftware should [illegible] [illegible]ndent on what [illegible]ou w[illegible]

[illegible]

The first thing to consider when deciding on which modem to use, is baud rate. Baud rate is the rate at which data transfer occurs and is measured in bits per second (bps). (Remember that a single character is made up of eight bits or one byte at least as far as eight bit machines are concerned.)

However when characters are sent from one machine to another, additional [illegible] signals are needed to indicate to the receiving computer the [illegible] character.

Therefore as a rule of thumb when converting from baud rate to characters per second you should divide by ten. Thus a baud rate of [illegible] is equal to 30 characters per second. Also the maximum baud rate which most telephone lines can [illegible] is 1200 bps.



The common baud rates used in Britain over the telephone line are 300/300, 1200/75 and 1200/1200.

When baud rates are written the downloading or receiving rate is written first and the uploading or sending rate is written second. In two out of three cases the rates in both directions are the same.

The baud rate 1200/75 is very popular in Britain (although never used in America) enables information to be received at 1200 bps yet sends information at only 75 bps. The baud rate 300/300 is used for Telecom Gold, Packet Switch Stream (PSS) and bulletin boards both in this country and the USA.

The baud rate 1200/1200 is used mainly for user-to-user file transfers and fast upload by editors on Prestel and Compunet. This is also used in the USA. Companies such as Prestel, Compunet, Telecom Gold, PSS and bulletin boards favour 1200/75.

[illegible]

Without going into too much detail at this stage, I'll briefly explain some words that I've used.

Prestel is a service run by British Telecom, yet its information comes from various firms, organisations and hobbyists.

[illegible] Compunet [illegible]

[illegible] by British Telecom [illegible] which allows [illegible] computer systems [illegible] different [illegible]

[illegible] British Telecom.

Bulletin boards are services provided by private individuals or companies for people with similar interests [illegible] commodore users.

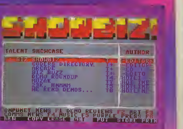
Interfacing the Modem to the Computer

When deciding which modem is needed, the next part to consider is how to interface the modem to the computer. The two main interface standards used are a) interfacing to the cartridge port and b) interfacing with the RS232 (usually via the user port). This can be an important point to consider, e.g. if you plug a modem or cartridge into the cartridge port of the 128 it will power up as a 64. Also some software will not let you print out via the user port if the modem is plugged into the cartridge port, but this is much more of a software problem.

[illegible]

[illegible] and perhaps [illegible] make, is software [illegible] viewdata compatible is the term [illegible] which work like Prestel [illegible] of information comes [illegible] our TV screen [illegible] It is similar to [illegible] other system [illegible] full of information [illegible] are its protocols [illegible] to those of [illegible] about [illegible] files via the [illegible] can work an [illegible] your friends [illegible] want to be able to look [illegible] and [illegible] at what [illegible] For the more adventurous [illegible] running your own bulletin board or becoming [illegible] Do you want to be able to print the information [illegible] on paper (e.g. a screen dump)? And [illegible]

Finally there are the more advanced features which [illegible] in a modem e.g. [illegible] That is, can you type in the number at the keyboard and let the modem dial for [illegible]. Can the modem auto-answer [illegible] phone rings your number [illegible] answer? This feature is only [illegible] necessary if you are running a [illegible] board and then it becomes [illegible] Has the modem [illegible] is a very important [illegible] are downloading [illegible] a file [illegible] e.g. Prestel and [illegible] Another question [illegible] the modem is full duplex? Full duplex is a [illegible] communication [illegible] screen displays what [illegible] as well as what is [illegible] the other computer [illegible] whatever you type is first [illegible] the other computer and then [illegible] back to your computer and [illegible] on the screen. So if you are [illegible] full-duplex and your typing appears on screen you know that the connection has been made.) Half duplex however lets you see only what is typed on the other computer. Some services use full-duplex and others half duplex and so it is necessary to consider this feature with baud rate once you know how you will be using your modem.


SHOWBIZ!

TALENT SHOWCASE

AUTHOR

```
BIZ SHOWBIZ                  EDITOR
CODERS DIRECTORY.       T+   EDITOR
ARCADE                  T+   ED
BIZ BUZZ                T3   EDITO
DEMO ROUNDUP            T4   HOTLI
MUZAK                   T7   HOTLINE
23K, HMMMM              T5   HOTLINE
WE KEND DEMOS...        T8   HOTLINE
ONPUNET NEWS F1 DEMO REVIEWS F2 ART F3
COMMS NEWS F4 MUSIC F5 PURPLE PRESS F6
NEW   COPY ERASE  GET   PUT   STORE PRIN
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[illegible]

Today there are many modems on the market. I will discuss some of them along with the various software packages that either come with them or which can be bought separately. This will provide you with sufficient information to let you investigate on your own before deciding which products to buy.

[illegible]

This autodial [illegible] is no longer being manu[illegible] many do exist. It is the [illegible] modem in as much as [illegible] systems with it. In [illegible] modem which can [illegible] accessing Compunet [illegible] the Co[illegible] it works at [illegible] duplex) [illegible] Compunet [illegible] good, cheap [illegible] modem when [illegible] modem is given away [illegible]

If you join Comp[illegible] can download (either for free or at a charge) various software including software for accessing Prestel, terminal software (i.e. for accessing scrolling systems like Telecom Gold) and user-to-user software (for transferring files), from Y2 Software. Software for prestel editing is available from Y2. This modem can be used with the 64 or 128 [illegible] approved.

[illegible]

The 64 Multi[illegible] can be used with the 64 and [illegible] (it lets you operate at all three baud [illegible] and has all the software [illegible] It costs £[illegible] including [illegible] many features including [illegible] and autoanswer which [illegible] for logging callers [illegible] The only additional [illegible] user-to-user and [illegible] be prestel editing [illegible] However as [illegible] become editors [illegible] so important at this [illegible] running a bulletin board available from Y2.

[illegible]

[illegible] Voyager 7 is no longer being manufactured yet there are still a lot [illegible] as it has the advantage of being used on other micros with the appropriate software. It [illegible] similar in specification to the 64 Multimodem but a cartridge is included which provides the software you need. Although the cartridge plugs into the cartridge port (logically!) the modem is an RS232 modem which is why it can be used on other micros.

Modems from Tandata

Tandata Marketing Ltd has produced various modems which use a serial interface from the TM110 which could be used with the VIC 20, 64 and 128 at a cost of £99 compared with the TM812T which costs £339. Tandata's modems usually allow all the combinations of baud rate with both full and half duplex along with other facilities like being able to store your phone numbers and passwords. This means that in order to log onto a system you simply press a couple of keys and the modem automatically dials the appropriate number and logs you on — very convenient as long as the modem does not fall into the wrong hands!

Modems from Miracle Tech.

The 64 Multi modem is a product from Miracle Technology but it cannot be used with other micros. On the other hand the WS2000, WS3000 and WS4000 are very versatile RS232 modems. The WS4000 costs £159 and has many features — as they all do. On the other hand the WS2000 costs only £99 and is still available. The WS3000 comes in various versions costing from about £300 upwards! They all come with the necessary software to drive both Prestel and Telecom Gold (terminal scrolling software). There are various versions of these modems including some expensive ones which have useful features like detecting the baud rate of the host machine and setting itself accordingly.

Connecting to a Service

Before powering up your computer make sure that your modem is in place and correctly connected to your computer. Never connect or disconnect your modem once you have switched on the computer. Always switch off first. If you do not you can blow some of the chips inside the computer. Once everything is physically in place, dial the computer you want to communicate with. If your modem autodials then just follow the manual's instructions and type in the appropriate phone number. If your modem does not autodial then you have to make sure that your phone is either plugged into your modem or into the same jack as your modem depending on which type of modem you have. Once you have dialled the computer and it has answered you will hear a high pitch whistle. You then connect the modem by pressing a button or a switch.

Which Service?

So far we have said that you have to decide on what you want your software to do before obtaining your modem. To do that you have had to decide which computers you will want to access. We will now take a brief look at the main systems in Britain, namely Prestel, Compunet and Telecom Gold.

Prestel

This is British Telecom's viewdata system. It is in colour with graphics and a screenfull of data is displayed at a time. A screen of data is 24 columns high and 40 columns wide. Although British Telecom own the computers which store the information the information is provided by various Information Providers (IPs). The IPs are numerous and vary immensely from the AA to the Zimbabwe Tourist Board. There are over 300,000 pages of information on almost every subject including Agriculture, Education, Banking, Microcomputing, Hobbies, Travel and Teleshopping.

Some of the IPs use Prestel as a gateway to their own computers, i.e. Prestel automatically connects you via a phone link to their computer. On Prestel there is the facility to receive and send mailboxes, receive and send telexes, to download software and to purchase certain items using your credit cards. You can even now use Prestel to access Telecom Gold! Prestel is not just a factual encyclopaedia, there are also many games available including multi-user games, quizzes and competitions.

Prestel is also cheap: 90% of all people in the UK have local call access. Even if you are abroad you can use PSS to access it. Computer connect time is only charged from 8am to 6pm Mondays to Fridays. At all other times it's free. Most pages are also provided free but some are charged for (e.g. finance pages) but you are always notified in advance. The only other charge which you will come across besides the Prestel subscription of £6 per quarter is the charge for various closed user groups (CUGS). Some CUGs are free, others are very expensive. The Prestel Microcomputing CUG is only £10 per quarter and this gives you access to literally thousands of pages. So for £16.00 per quarter you have access to a magazine which is updated frequently and which consists of thousands of pages. Some interesting areas are also in the Prestel Microcomputing CUG even though they are not exactly Microcomputing such as Amateur Radio in the ClubSpot area.

Micronet

The Prestel Microcomputing CUG is owned by a company called Micronet. Micronet is the biggest IP on Prestel which explains why they can produce so many lovely things. The advantage for newcomers who have not yet purchased a modem is packages. These packages usually £99 (although £129 for the Amiga) include a modem and software for accessing Prestel *plus* a year's subscription to Micronet and Prestel (which is worth £64). So for £35 you get a modem and software. These packages exist for the Commodore 64, 128, +4, Amiga and PC (as well as for other micros).

Compunet

As I've said before, only the CBM modem can be used to access this system. A subscription to Compunet can cost anything from £9 to £15 a quarter depending on the type of account required. There are connect time charges but some of these can be dispensed with if you have a GOLD account (£15 per quarter). If you take out a quarter's Gold subscription plus post and packing of £3.50 a modem will be provided free of charge!

There is not local call access for everyone. So why use Compunet? Compunet does provide facilities that Prestel does not, e.g. you can buy items and have them charged to your Compunet account (which is something Prestel does not do). Compunet also has various IPs but not nearly so many as Prestel, but the information on the system is all geared to 64/128 users, but is not only to do with Microcomputing — there is also a hobbies section. Unlike Prestel where viewers cannot edit or upload pages unless they have access to the editing computer, Compunet users can upload pages into an area called the Jungle and without the need to use a separate computer.

Compunet also has a useful editor which can be used both online and offline. It has many facilities and it is the way you print pages from Compunet. Compunet also has a duckshoot menu so when you want to go into the editor for example, you move the cursor until it gets to editor and then press return. Prestel on the other hand is mainly operated by numbers which originates from the days when most terminals were not alphanumeric. Prestel has recently begun to use words called keywords so instead of *810?# you can key *RSGB# or *ICPUG#. The main disadvantage with Compunet is that it is slow, but improvements are being in the system to speed it up.

Telecom Gold

This is a scrolling system in black and white. It is ideal for sending and receiving long documents or for searching special databases which are expensive (£1 a minute). Telexes are fairly cheap on Telecom Gold. There are however, connect charges at all times and these are expensive when compared with Prestel or Compunet. For example after 7pm in the evening Telecom Gold's connect charges are three pence a minute. Prestel is free and Compunet is about 60 pence an hour (a penny a minute). However no-one remains on Telecom Gold for long, it is not meant to be a system which you browse around, although various items of useful information and facilities are provided. Like Prestel it can be accessed by PSS.

Bulletin Boards vary considerably and either use scrolling or view data compatible software. One of the well-known viewdata compatible BBs is Databox, RSGB's bulletin board for Amateur Radio Hobbyists (Tel 0707 52242). Like most Bulletin Boards few phone lines are available which means that you may find it hard to get on to the system at popular times or of course the software can fall over!

Touchlines
Compunet Teleservices Ltd, *Sheraton Business Centre, Wadsworth Road, Perivale, Middlesex UB6 7JB.* ***Tel*** *01 965 8866*
Y2 Computing Ltd, *113 St Albans Road, Watford, Herts WD2 44L.* ***Tel*** *0923 50161*
Prestel *page 60019918. They sell various communications software for most CBM machines.*
Tandata Marketing Ltd, *Albert Road North, Malvern, Worcs WR14 2TL.* ***Tel*** *06845 68421 (Page 799 Prestel)*
Miracle Technology (UK) Ltd, *St Peters Street, Ipswich, Suffolk IP1 1XB.* ***Tel*** *0473 216141*
Micronet, *Durrant House, 8 Herbal Hill, London EC1R 5EJ.* ***Tel*** *01 278 3143*
Prestel ***Tel*** *01 822 1122 or Freephone Prestel Sales*
RSGB, *Lambda House, Cranborne Road, Potters Bar, Herts EN6 3JE.* ***Tel*** *0707 59015*

AMAZING NEW 'TOTAL BACKUP' CARTRIDGE FOR COMMODORE 64 AND 128 (IN 64 MODE)
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Code Inspector
Compatible
£29.99
DiskMate Cartridge V.2
£14.99
Graphics Slideshow
LOOKING GOOD AT £4.95
SPECIAL OFFER
100% SUCCESS? WE ASK WHO'S KIDDING WHO?
Enhancement Disk
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The DoSoft Collection
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DoSoft Super Disk Kit
Mega MegaTape Savings
BUY NOW £5 BRILLIANT!
Xidex Precision Disks
TWELVE FOR ONLY £8.50!
DoSoft
You'll Do it Better with DoSoft
FAST DISK UTILITIES • LOADERS • 2-MIN DISK COPY • FAST DISK FILE COPY • FAST FORMAT
HARDWARE TRANSFERS MULTI-PARTS • DUMPS HI-RES SCREENS
DISK TO DISK • DISK TO TAPE • TAPE TO TAPE • TAPE TO DISK

Freeze - A Jolly Good Fellow?

Freeze Machine is a combination of two of Evesham Micros utility programmes encapsulated within a single cartridge. Bringing together Freeze Frame MkV and Lazer MkII enables you to back up your programmes in a form which will reload in seconds rather than minutes

By Eric Doyle

Freeze Frame is designed to produce backups of any program that you own including commercial programmes. This obviously raises the question of copyright and piracy (or theft as I prefer to call it). Evesham Micros are well within their legal rights to produce utilities such as this and would say publicly that they do not condone program theft. By stamping the legend STRICTLY FOR PERSONAL USE across their instruction booklet they absolve themselves of any uses which the purchasers of the cartridge may put it to. The misuser of the cartridge is the thief.

It's a bit like buying a gun. The purchaser is bound by the law not to fire the weapon in such a way as to cause personal injury to someone. That doesn't mean that shootings don't occur and when one does the legal process swings into action against the user, not the manufacturer. This analogy holds out quite well but I feel I must point out that there is no such thing in Law as accidental copying!

To own a backup you should also have the original program; if you don't then how can you plead innocence? If you steal a program then it is not just the company producing that package that suffers but the programmer. *Your Commodore* in no way condones the theft of games but we cannot ignore the fact that fast backup copies are businesslike.

As a journalist the main application for my home micro is for word processing. I favour the Superscript package but it takes 2 minutes 24 sec to set it up the way I want it. Not a long time but it's over two minutes of not earning cash! Could a fast load help me out? Yes, with Freeze Machine it takes about 20 seconds using the Lazer loader and 50 seconds without it. Over a year this could increase my take-home pay by over £100, more than enough to cover the cost of the cartridge, plus there are all the other programmes I use ready to be backed up.

> **"It's handy to be able to save and load all my development programmes at high speed and this is possible with Lazer"**

The Lazer cartridge has two reset buttons, one brings in the Freeze facility and the other toggles between the Fastload and Lazerload menus.

In trials I was not convinced that Lazer was necessary for two reasons. Firstly, the fastload facility was not significantly slower than Lazer but secondly, and far more importantly, the Lazer program file is stored as a locked USR file. This means that either the cartridge or a 'boot' program is necessary to load it and it always loads at turbo speed. The effect of this is that when your disk drive becomes slightly misaligned or varies in speed later in its life all of your USR files will be useless until your drive is repaired. This can be a nuisance.

Turbo loaders are far more sensitive to speed variation than is the standard loading system. So a system which offers both alternatives is the belt and braces system for me. This means the fastloader in the Lazer cartridge.

Of course, backing up commercial programmes is just one use of the cartridge. For a programmer like myself it's handy to be able to save and load all my development programmes at high speed and this is possible with Lazer. I can also fast-format disks and use the DOS system to scratch and validate files. The only thing I miss is a built in monitor which would be useful. I'm spoilt because I must admit to being the proud owner of Evesham Micro's miraculous Dolphin DOS system which makes Lazer look slow. Evesham claim a speed increase of over 20 times with Lazer but my tests using a standard C64 came nowhere near to this.

Inside the Lazer cartridge there is a very powerful utility set for your C64. It won't work with every piece of commercial software on the market but a large proportion of them *can* be backed up. At £28.95 it's a steal!

Touchline

Evesham Micros**, 63 Bridge Street, Evesham, Worcs WR11 4SF.* ***Tel *(0386) 765500*

Contributions

So you own a Commodore? So you've written some programs? So why haven't you sent them to us?

Your Commodore is always on the look out for new programs hints and tips articles and even regular series In fact if you have something that you think could be of use to other Commodore owners we want to hear about it

So if you have got something which you think we may be interested in How do you go about submitting it to us?

Below you will find a list of guidelines that will help us to deal with any item that you send in to us We don t expect everybody to be the next William Shakespeare but if you do follow these simple rules then it will make our job a lot easier

1) If possible all material sent to the magazine should be typed or printed out on a computer printer

2) All text should be double spaced i e there should be a blank line between each line of text You should also leave a margin of about 10 characters around the text

3) On the very first page you should put the following

Name of the article
Machine that it is for
Any extras required – disk printer etc
Your name
Your address
Your telephone number

4) The top of every page should have the following information on it

Abbreviation of the article title
Your name
The page number

For example suppose you had submitted an article on C64 interrupts You should put something like the following at the head of the page

Interrupts/J Smith/1

5) Please make sure that you do not make any additional marks on your text especially underlining

6) Try and write in clear concise English it does not have to be a work of literature but it must be comprehensible

7) On the bottom of each page you should put the word MORE if there are more pages to the article or ENDS if it is the last page

8) If possible enclose a listing of all programs

9) Under no circumstances use a staple to hold the pages together Use a paperclip instead

10) Programs should be included on either disk or tape Make sure that you SAVE two copies of every program so that we have a better chance of loading them if problems occur

11) Programs under 10 lines can be included in the text If your program is longer than this you must enclose a disk or cassette

12) If your article needs any artwork then supply clear examples of what is needed We don't expect you to be an artist but we do need to see what is required

13) Photographs if necessary must be either black and white prints or colour slides We can take shots our selves so don t worry about this too much

14) Submissions of any length are welcome If you have a five liner routine that you think may be of use to someone else we welcome it just as much as a full blown six part series

15) Payment varies quite a lot and depends on quite a number of factors such as complexity of program presentation of program number of magazine pages it takes up etc Payment is generally between £10 00 and £800 00

16) All payments are made in the month that the magazine containing your article has appeared in print

17) If we do find your submission suitable for inclusion in the magazine we will write to you giving the terms of publication the rate of payment and an agreement form Prompt return of this form will allow us to use your program as soon as possible

18) If you want the program returning to you should we find it unsuitable for publication, then you should enclose a stamped self addressed envelope

19) The last and most important point to make is get writing' we are waiting for your articles

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ACE 2
ACE 2
High speed one or two player action
ACE 2
CASCADE
ACE 2
THE ULTIMATE
HEAD TO HEAD
CONFLICT

Commodore 64 Disk	£14.95
Commodore 64 Cass.	£9.95
Spectrum 48 Cass.	£8.95
Spectrum 128 Cass.	£9.95
Commodore Plus-4 (64k)	£9.95
IBM PC	£19.95
Atari ST	£19.95
(IBM and Atari for Christmas)	

Using an Epson-type printer with the C64

The Epson-Type printer is probably put to best use when used in conjunction with a word-processing program such as Commodore's own Easy Script

Interfacing a C64 to your printer can sometimes be a real chore It is necessary initially to obtain an interface cable to connect the C64's user port to the printer's Centronics interface This can be bought for about £20 (including some interfacing software) or can be made for about £8 if you are handy with a soldering iron (see separate panel) *No expensive interface cartridges are necessary!*

Connect the printer to the C64 and load up Easy Script On the initial screen you should enter a 1 in printer type and a 'C' when you are prompted for interface type From then on the printer responds normally and you may use a number of extra command characters to exploit the various modes of the printer Some details are found on the Easy Script disk in the 'MX/FX info' file which you can print out

Overcoming Problems in Basic

Listing BASIC programmes is a possible problem since Epson printers don't have the special Commodore cursor/colour control symbols However, overcoming this is not too difficult – load and run the BASIC extension program supplied with November's *Your Commodore*, load the program to be listed, and use the CODE command to convert the listing into a readable format without special codes Now open a file to disk or tape and list the program as follows

```
Disk   OPEN 2,8,2"0 programname
TXT S W    CMD2  LIST
Tape  OPEN 2,1,1,"Programname
TXT"   CMD2  LIST
```

This writes the program as a text file If you now use Easy Script you should be able to load this file and print it as normal This has the added advantage that your listing will have pagebreaks that don't print over the perforations Also you can re format the listing to indent FOR/NEXT loops etc

Without the Basic Extension

If you don't have the BASIC extension then don t worry any special characters will usually appear in the listing as blank spaces If you don t have a word processor then it is possible to use the interface software supplied with the cable Or run this short program by P Cornes which echoes all screen output to the Centronics printer (activated/de activitated by SYS 49152

```
10 FOR C   = 49152 to 49238
             READ B
20 POKE    C.B   NEXT C
30  DATA  162,0 142,1,221,202,142
40  DATA  3,221 173,2 221 9,4
50  DATA  141 2 221,173,0 221 9
60  DATA  4 141 0 221,173 38,3
70  DATA  174 85,192,141 85 192, 14
80  DATA  38 3 173 39 3 174 86
90  DATA  192,141 86,192,142 39 3
100 DATA  96 141 1 221,72,138 72
110 DATA  173,0 221,41 251 141 0
120 DATA  221,162 2,202 208 253 9
130 DATA  4 141,0,221,173 13 221
140 DATA  201,16 208 249 104
           170 104
150 DATA  76 50 192
```

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IMPLOSION
WHEN YOUR World is UNDER ATTACK...
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Tel (0[illegible]) [illegible] Telex 265871 MONREF G Quoting 72 MAG 31[illegible]

Screen shots are taken from the C64 version

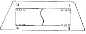
Making a Centronics Cable

If you feel that you can tackle fairly fine soldering then you can make your own Centronics cable quite easily. You will require

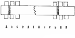
1 × Amphenol 36 way male Centronics plug for the printer end
1 × Commodore 64 user port edge connector for the C64 end
3m × 12 core shielded round cable
(These should all be available from hobbyist electronic shops.)

The two plugs must be wired as follows

Printer end



Computer end



PRINTER	C64
1	M
2	C
3	D
4	E
5	F
6	H
7	I
8	K
9	L
10	B
16	A

Please note: Making the lead longer than 3m is likely to cause problems (technically known as Skew errors.)

Easy Script and Epson-type Printers

If you have successfully connected your C64 to an Epson-type printer you may find it helpful to know how to get all of the printer's special functions to operate from Easy Script. Some of the special characters required to operate an Epson printer are integral to Easy Script since Precision Software had Epsons in mind when they designed the program.

These features are accessible by pressing <f1> and then one other key. Other functions must be sent to the printer as a row of characters usually commencing with the *ESCAPE* character which is produced by pressing <f1> and then the up-arrow which then appears as a reverse 'E'. Escape and '4' for instance selects italic printing.

Some functions require the use of other character codes which are not available from the keyboard such as the ASCII character whose code is 0. In order to use these it is necessary to predefine a special character for each code and assign that character the required decimal value.

Easy Script provides up to ten such special characters which can be used by pressing <f1> followed by one of the numbers 0 to 9. To define, say, a character of ASCII value 65 to key 6 and a value of 67 to key 8 type a line in Easy Script as follows

<f3>6=65 8=67<return>

Now pressing <f1> followed by a '6' should produce a reverse '6'. When printed this character will act as if it were ASCII 65 i.e. a capital 'A'. It is useful to define 0=0 1=1 since many functions use these ASCII values. Some other printer commands are produced by <f3> plus a short command.

Controls for Epson-Type Printer with Easy Script

Enhanced	<f1>/[and <f1>/]
Emphasised	<f1>/(and <f1>/)
Underlined	<f1>/; and <f1>/:
Double	<f1>/% and <f1>/%
Condensed	<f1>/' and <f1>/\
Superscript	<f1>/' each character.
Superscript on constant	esc 'S' 0 until
Superscript off	esc 'T'
Subscript	<f1>/, each character
Subscript on constant	esc 'S' 1 until
Subscript off	esc 'T'
ELITE	<f3>/pt10
PICA	<f3>/pt12
Italic	esc '4'
Italic off	esc '5'
Proportional on	esc 'p' 1
Proportional off	esc 'p' 0
NLQ on	esc 'x' 1

NLQ off	esc '/' 0
Disable paper-end error	esc '8'
Enable paper-end error	esc '9'
Initialize printer	esc '@'
8 LPI line spacing	<f3>/1p8
6 LPI line spacing	<f3>/1p6
7/72" line spacing	esc '1'
Line spacing n/72"	esc 'A' n
Line spacing n/216"	esc '3' n
Standard density graphics	esc 'K' n_1 n_2
Double density graphics	esc 'L' n_1 n_2
D/d'sity D/speed graphics	esc 'Y' n_1 n_2
Quad density graphics	esc 'Z' n_1 n_2
Backspace	<f1>/ backarrow>

Most of these commands are self-explanatory but a few need explanation. Backspace can be used to produce special characters by combining two others e.g. using = and / to produce ≠. First type = then <f1> backarrow then . This will produce the new symbol.

Producing single graphic characters is done in a similar way to user-defined graphics on the C64. The characters are designed on a grid 8 dots high by up to 65535 dots wide. Suppose we want to define a lower case Greek DELTA.

First we design

```
 0     0     *     *     *     0     0     ×    128
 0     *     0     0     0     *     0     ×     64
 0     0     *     0     0     0     0     ×     32
 0     *     *     *     0     0     0     ×     16
 *     0     0     0     *     0     0     ×      8
 *     0     0     0     *     0     0     ×      4
 0     *     *     *     0     0     0     ×      2
 0     0     0     0     0     0     0     ×      1
---   ---   ---   ---   ---   ---   ---
12    82    178   146   140   64     0
```

Note that it requires 7 ASCII numbers to define this character. 7 in Low byte/High byte format is 7 and 0 (i.e. (1×7) + (0×256) = 7).

Now we define the ASCII characters for each column plus two for the numbers of columns to be used

<f3>0=0 1=1 2=7 3=12 4=82 5=178 6=146 7=140 8=64

To produce the delta in single density graphics we now type

esc K <f1>2<f1>0<f1>3<f1>4<f1>5<f1>6<f1>7<f1>8<f1>0

To produce the delta in double density graphics we must have double the number of columns so we define

<f3>2=14
and type

esc L<f1>2<f1>0<f1>3<f1>3<f1>4<f1>4<f1>5<f1>5<f1>6<f1>6<f1>7<f1>7<f1>8<f1>8<f1>0<f1>0

The same principle holds for quad density graphics.

One final trick – micro lettering! This is achieved by using subscripts (which are half-height) with condensed mode characters and also reducing the line feed to about half the normal distance.

Select Condensed mode by using <f1><
Select Subscript by using esc S<f1>0
Choose a line spacing of about 14/72 and therefore define <f3>9 as 14 by <f3>9=14 return
Select 14/72" linespacing by using esc A <f3>9

Shadow Boxing

Use the shadowy area of your computer's memory to improve your Basic storage space

By Rick Astley

A rather back-handed compliment that may be paid to the C64 is that it has encouraged many a programmer to learn machine code, the reason being that its space-saving Basic is rather slow for some types of program.

However, there are programmers who do not necessarily agree that a move to machine code is a progressive step. To meet these programmers' needs, many machine code routines have been written which augment the C64's Basic. The following describes three more.

The programs have been written in recognition that the 64's 40K of Basic bytes can be severely drained by the need to store data. This data may represent numerical or text information, sprites or perhaps screen data and associated colour memory. The 4K of memory from 49152 to 53247, whilst easy to address, is nevertheless rather limited. The programs we are to meet here, known by mnemonics MEX, MAVE and SYSSY, make the 8K RAM hidden in the shadow of the Basic interpreter much more accessable in Basic.

The shadow memory refered to, between 40960 and 49151 and known as LORAM, is actually perfectly simple to POKE to in the normal way. The C64 knows that it is futile to try to write to ROM, and so responds to any attempt to do so by switching the ROM out and the RAM in to receive the POKE. The Catch 22 with LORAM is that in order to PEEK it you need to switch the ROM out; however, this ROM is the Basic interpreter and with it switched out the PEEK instruction cannot be understood.

The answer is to utilise a short machine code program which can access the Shadow RAM. The program here is called MEX, short for Memory Exchange. MEX will exchange any nominated segment of memory for any other of identical size. If a chosen area includes that from 40960 to 49151, then LORAM will be exchanged. This allows the Basic programmer to LOAD or POKE data to LORAM (sprite data perhaps or a screen) and, when required, call MEX and swap it for similar data which is not required for the moment and which is in memory accessable to Basic. No data is lost: calling MEX again will re-exchange each byte back to its original place, or to some other position if you change the parameters.

Before using MEX it is necessary to decide on three pieces of information: the number of 256-byte blocks to be exchanged and the two addresses from which they are to start.

As an example, suppose you wished to swap the 8k bytes from 32768 to 40959 for that in LORAM from 40960 to 49151 inclusive. First remember that the area 32768 to 40950 should have been protected from being over-written by Basic if you want to use it for data storage. Do this by POKEing location 52, the bottom of string storage, and 56, the highest address used by Basic, with 128 (because 32768/256=128) before RUNing any programs. The size of the memories to be exchanged is 8k, which equates to 8*1024 or 8192, so the number of 256 byte blocks involved is 8192/256, which is 32.

Your program line may look something like this:

```
5 POKE 52,128: POKE 56,128:
SYS50000,32768,40960,32
```

MEX is wholly portable and, although it has been put at 50000 and is called by SYS 50000, it may move to wherever you wish by changing line 10 of the basic loader and modifying the SYS command accordingly.

Saving from Memory

MAVE is the Memory SAVE program. Unlike MEX, which is RUN from within your program, MAVE uses a small amount of your memory but is not needed within the program. However, like the other two programs it may be moved to any convenient area in the manner explained later. If using a disk drive, the cassette buffer is available to you and in this case

MAVE is outside your main program/data area

MAVE is called by the immediate command
SYS 50075 SA,EA "PN" DN
where SA is the start address (usually 0801) EA is your end address + 1 PN is your program name DN is the saving device number (1 for cassette or normally 8 for disk)

```
PROGRAM  SHADOW

54  10 X=50000 Y=0
D0  20 READ A IF A = -1 THEN 40
67  30 Y=Y+A POKEX,A X=X+1 GOTO
    20
83  40 IF Y=25639 THEN PRINT "OK
    " END
32  50 PRINT CHECK SUM =" Y   BU
    T SHOULD BE 25639
31  60 PRINT DIFFERENCE - " Y 25
    639
A5  100 DATA32 253 174 32 138 17
    3 32
35  110 DATA247 183 165 20 133 2
    51 165
0E  120 DATA21 133 252 32 253 17
    4 32
7E  130 DATA138 173 32 247 183 1
    65 20
F4  140 DATA133 253 165,21 133 2
    54 32
26  150 DATA241 183 134 255 165
    1 41
58  160 DATA254 133 1 177 251 17
    0 177
7D  170 DATA253 145 251,138 145
    253 200
DF  180 DATA208 243 150 255,240
    6 230
39  190 DATA252 230 254 208 233,
    165 1
C5  200 DATA8 1 133 1 96 162 4
30  210 DATA181 42 145 250 202 2
    06 249
30  220 DATA32 253 174 32 138 17
    3 32
06  230 DATA247 183 165,20 133 4
    3 165
39  240 DATA21 133 44 32 253 174
    32
38  250 DATA138 173 32 247 183 1
    65 20
05  260 DATA133 45 165 21 133,46
    32
08  270 DATA253 174 32 212 225 1
    65 1
26  280 DATA41 254 133 1 166 45
    164
30  290 DATA46 169 43 32 216 255
    165
AE  300 DATA1 9 1 133 1 162 4
3B  310 DATA181 250 149 42 202 2
    08 249
67  320 DATA36 162 8 181 44 157
    51
E0  330 DATA3 202 208 248 134 10
    32
9A  340 DATA212 225 165 10 166 4
    3 164
F0  350 DATA44 32 213 255 162 6
    165
50  360 DATA51 3 149 44 202 208
    248
E8  370 DATA86 0 -1
```

Where MAVE differs from other SAVE utilities is that should you have data stored in LORAM then it will save this rather than the Basic interpreter ROM

Overcoming LOAD Problems

Unfortunately there is a disadvantage to using a cassette when LOADing to LORAM The C64 loading system will LOAD your data into LORAM but this data is recorded twice on your tape and at the second pass the system compares the tape data with that supposedly LOADed on the first pass This is normally a good check for LOAD errors but when loading to LORAM the check is made not against the contents of that area but against the ROM above it The result is an error message which you can ignore in immediate mode but which stops a program if the LOAD is made from within it

LOADing data into high memory from disk can also be a source of annoyance but this time the difficulty occurs in immediate mode rather than from within programmes The problem reveals itself is an out of memory error the system assuming that because the last data was high in memory everything below it is full

SYSSY overcomes both these quirks SYSSY starts 155 bytes after MEX and so if you keep the basic loader start at 50000 and then make the variable SY equal to 50155 you call it as follows

SYSSY "NAME" 1 1
for tape or
SYSSY "NAME" 8 1
for disk

MEX MAVE and SYSSY have been kept quite simple using many routines already resident in the 64 so that they will not take hours to type in via the single Basic loader SHADOW Nevertheless it is worth testing them and practising their use with the short Basic programmes listed here called SCREEN TEST 1 and SCREEN TEST 2

Testing

First LOAD and RUN SHADOW and if the computer responds with OK delete the Basic loader with NEW Next type in SCREEN TEST which operates as follows -

Line 5 sets the character colours This line is required only on older C64s If POKE 1024 160 on a freshly switched-on computer does not produce a square in the top left hand corner you will need this line

Line 10 sets the variable MEX to the start address of the program
Line 20 draws a series of vertical lines onto the screen
Lines 30 through 60 draw a similar set of horizontal lines in LORAM
Line 70 the SYS command directs the program to the routine MEX the memories to be exchanged to start at 1024 (the screen) and 40960 (the start of LORAM) and the amount of memory involved to be 4 blocks of 256 bytes which equates to 1024 exactly one screen's worth of data
Line 80 ensures that the exchange occurs whilst the flying spot which traces your T V picture is off the screen
Line 90 loops back to re-exchange the data

SAVE and RUN SCREEN TEST Note how slowly the vertical lines are drawn in Basic and wait a little longer for the horizontal lines to be drawn in LORAM As soon as MEX is called however the speed of the machine code program is immediately evident as it alternately exchanges the vertical and horizontal lines from screen to LORAM In fact the speed of interchange produces a chequered pattern which is even more apparent if line 80 is deleted

Now press RUN/STOP and SAVE the pattern in LORAM with
SYS50075 40960 41984 PATTERN 1
If using disk then the last digit should be set to 8 As with standard SAVE routines you may add a final 1 as a secondary address to ensure that the pattern LOADs back to the memory from which it was SAVEd This can also be achieved by adding 1 when LOADing

Now modify SCREEN TEST 1 to make program called SCREEN TEST 2 In the new program
Line 1 is simply an aid to memory
Line 10 ensures the program RUNs from line 20 after LOADing PATTERN
Line 15 has to be added SYSSY calls the LOAD routine and is actually SYS SY where SY = 50155
Lines 20 to 50 are modified so as to draw a diagonal pattern which

contrasts with the horizontal or vertical lines whichever were LOADed with PATTERN.
Line 60 is no longer used and should be deleted.
Lines 70 to 90 remain unchanged.

When it is RUN SCREENTEST2 should first LOAD the SAVEd PATTERN without the error message which would normally occur from a tape LOAD into LORAM.

Next the diagonal pattern will be drawn after which MEX starts swapping the pattern LOADed into LORAM with the diagonals drawn by lines 20 to 50.

In the above exercise MEX, MAVE and SYSSY have all been used. Each however may be loaded elsewhere in memory either independently or as a single program. To do this change line 10 of the Basic loader. Once loaded MAVE can be used to SAVE each one as a machine code program as was done with PATTERN.

Note the position of each program when loaded using SHADOW.

MEX runs from 50000 to 50074
MAVE from 50075 to 50154
SYSSY from 50155 to 50190

The ability to use LORAM gives the Basic programmer continuous RAM from 2048 to 53247 save for the 190 bytes used to store the utility described here. Used effectively more elaborate Basic programmes can be produced hopefully compensating for that oh so evident lack of speed.

```
PROGRAM  SCREEN TEST1

70   1 REM SCREEN TEST
EF   5 POKE 53281 14 PRINT CHR$(1
     47) POKE 53281 6
33   10 MEX=50000
E0   20 FOR X=1024 TO 2023 STEP 2
      POKE X 32 POKE X+1 160 NEXT

85   30 FORX=40960 TO 41920 STEP
     80
C5   40 FORY=0 TO 39 POKE X+Y 32
     NEXT
D1   50 FORY=40 TO 79 POKE X+Y 16
     0 NEXT
8E   60 NEXT
C4   70 SYS MEX 1024 40960 4
F5   80 WAIT 53265 128 WAIT 53265
      128 128
F4   90 GOTO 70
```

```
PROGRAM  SCREEN TEST2

70   1 REM SCREEN TEST
EF   5 POKE 53281 14 PRINT CHR$(1
     47) POKE 53281 6
DF   10 MEX=50000 SY=MEX+155 F=F+
     1 IF F = 2 THEN 20
D4   15 SYSSY  PATTERN  8 1
12   20 FOR X=1024 TO 1943 STEP 8
     0
6F   30 FOR Y=0 TO 39 STEP 2 POKE
      X+Y 55 POKE X+Y+1 223 NEXT
C8   40 FOR Y=40 TO 79 STEP 2 POK
     E X+Y 223 POKE X+Y+1 55 NEXT

F8   50 NEXT
C4   70 SYS MEX 1024 40960 4
F3   80 WAIT 53265 128 WAIT 53265
      128 128
F4   90 GOTO 70
```

LIFESAVERS 6	C64, C128, C16, PLUS/4	MESSAGE SCROLLER	1/1

How often have you wanted to put a scrolling message across your screen?

Presented here is a short Basic routine that will enable you to place a scrolling message anywhere on your screen with ease.

The routine requires that the message to be scrolled is held in the variable A$. The delay between printing each character should be assigned to DEL. The width of the message is held in variable WD and the positioning of the string is held in D$.

The positioning of the string is done by placing a HOME and a number of cursor downs and lefts in the string.

Note A$ and D$ should not exceed 255 characters in length or a string too long error will occur.

Alexander Chambers
Brislington

```
1000 REM ********************
1010 REM * MESSAGE SCROLLER *
1020 REM ********************
1030 A$="[WHITE]THIS IS AN EXAMP
LE OF THE MESSAGE SCROLLER FOR '
YOUR COMMODORE''
1040 DEL=40 WD=20
1050 D$="[HOME,DOWN12,RIGHT10]"
1060 PRINT"[CLR]"
1070 L$="[RIGHT4]" A$=L$+L$+L$+L
$+A$+" "
1080 FORI=1 TO LEN(A$)
1090 PRINT D$,MID$(A$,I,WD),CHR$
(145)
1100 FORJ=1 TO DEL NEXT J,I
1110 GOTO1070
```

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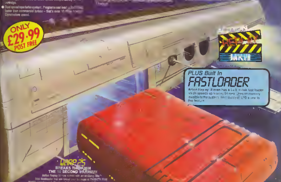
- Freeze the action [illegible] feature. [illegible] or backup – [illegible]
- Picture Save [illegible] tape. [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]
- [illegible]



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[illegible]	[illegible] TIME		
ACTION REPLAY MK II [illegible]	5 SECS	THREE	NO
ACTION REPLAY MK III [illegible]	9.5 SECS	THREE	NO
FREEZE FRAME (MK IV)	40 SECS	TWO OR THREE	NO
FREEZE FRAME (LAZER)	2[illegible] SECS	TWO	YES
[illegible] SYSTEM	[illegible]	THREE	NO

All purchasers of Action Replay III will receive WARP*25 FREE with their cartridge. Existing Action Replay III owners can obtain WARP*25 Disk turbo by sending £2.50, post free. (No need to send your cartridge). OR obtain it FREE on the Enhancement Disk (£7.95).

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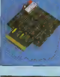

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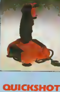

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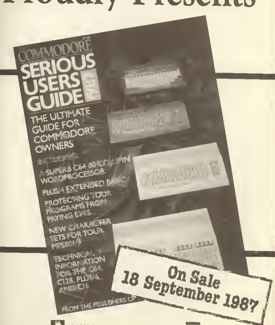

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Code Comfort

York Electronic Research is a small company specialising in hardware and software utilities which are worthy of more attention. The latest releases include a 6502 assembler and a Z80 compiler for the C64.

By Eric Doyle

The 6502 Assembler from York Electronic Research (YER) is a no frills two pass assembler which eases the problems of coding considerably by allowing labels to be used. This means that subroutines can be called by giving them a name of your choosing and variables used within the routine can also be named. It's easier to explain this by example.

Let's use a short routine for clearing four lines of the C64 screen in conventional mnemonic form.

```
C000  LDY #$28
C002  LDA #$20
C004  STA$03FF Y
C007  STA$0427 Y
C00A  STA$44F Y
C00D  STA$0477 Y
C010  DEY
C011  BNE$C004
C013  RTS
```

In YER assembly code this becomes

```
0001  ORG 49152  decimal for $C000
0002  SPACE=32
0003  SCREEN=1024
0004  WIDTH=40
0005  ;ROUTINE STARTS HERE
0006  LDY #WIDTH
0007  LDA #SPACE
0008  CLEAR  STA SCREEN-1 Y
0009  STA SCREEN+39,Y
0010  STA SCREEN=79 Y
0011  STA SCREEN+119,Y
0012  DEY
0013  BNE CLEAR
0014  RTS
```

As you can see the purpose of the routine is much clearer and the facility to include REM style statements following a semi colon adds to the clarity. The main advantage is that jump and branch calls rely on a label, not a finite memory location. This means that adding a line within the program automatically adjusts the calls accordingly on assembly of the final code. Relocation is also easier. By simply changing the ORG address the assembler will then use this as the base address for all jumps and branches.

Although I've said that YER's assembler is lacking in frills this has the advantage of leaving 39K of memory free for program workspace. Add to this the fact that programmes can be chained onto one another and you soon see the power that this utility conceals.

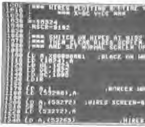
There are only fourteen editor commands.

A – assemble current source text
B – return to Basic
C – verify a saved file
D – delete lines
E – edit a line
G – get a file from tape/disk
H – hunt text for a string
I – insert new lines in text
L – list a line set L
N – clear memory (new)
O – recover text (old)
P – save text to tape/disk
S – define output device
V – list text to screen

Some kind of DOS to call up disk directories and scratch unwanted files would have been a sensible addition, but this would be at the cost of assembler program space. At least you can always switch back and forth from program control to Basic without disturbing your assembler code.

Within the actual assembler listing the normal mnemonic codes work as expected but there are ten directives to assist program writing.

LOF
LON
CHN
BEG



DBY
DWO
SPC
POK
ORG
AUT

At assembler code generation time LOF and LON simply suppress or enable the listing of the assembled code to go to the monitor screen. As printing to the screen takes time a significant increase in assembly time can be gained by suppressing the screen display of the code when the assembly option (A) is employed.

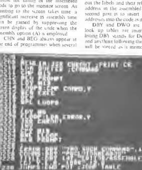
CHN and BEG always appear at the end of programmes when several listings are chained together. CHN tells the assembler to load the next part of the chain during assembly, and BEG is used at the end of the final part of the chain so that the second pass can be initiated from the first part program of the assembled chain.

The reason the chain has to be loaded twice is that the first pass sorts out the labels and their related actual address in the assembled code. The second pass is to insert these finite addresses into the code as it assembles.

DBY and DWO are used when look up tables are inserted into a listing. DBY stands for Define BYtes and anything following this command will be stored as it memory byte or string of bytes. For example

DBY 147 "READY"

This would store the clear screen (147) value as the first byte followed by each value for the word READY in the following five memory locations.



DWO is followed by a series of lable names used in the program. At assembly time the program stores the high and low bytes of the memory locations of the label as a look up table.

SPC is followed by a number which allows a gap of up to 256 bytes to be placed within a program to leave space for variables and arrays.

At assembly time you have two options. The code can either be poked directly to its final address or stored as a basic booted relocator program.

The straightforward memory assembly is directed to the start address by the POK command. In our screen clearing routine POK 49152 would cause the assembler to try to poke the code directly into memory. In this case a clash with the storage area of the actual assembler program would cause an OUT OF MEMORY message to be generated forcing the use of the second assembly method.

ORG assembles the program in the low basic programming area preceded by a routine which will move the block of code to its actual execution address when RUN is entered. The AUT command can also be used for force the boot program to jump to the new code without having to enter a SYS command.

On the whole the assembler works well but correction of a bad line is a long winded affair. If an error has been entered in line 0006 of the program the correction routine would look like this

L6	list correction line
0006	LDM # WIDTH
D1	delete that one line
I	insert a line
0006	LDY # WIDTH

The instructions are good but the area of saving assembled code is not covered in sufficient detail. There is no way within the program to save the assembled code so a return to Basic must be made and a save can then be made using the normal SAVE command. None of this gets a mention which could confuse a beginner and it took me a while to work it out for myself.

Nevertheless the York Electronics Research Assembler is one that I would recommend for someone making their entry into machine code programming. All of the essential features are included within the program, and there are not enough commands to confuse a novice.

The Z80 Emulator

The second of YER's products is the Z80 Emulator. Before going any further I would just like to say that this is purely an educational aid. There is little possibility of transporting the code directly across to a Spectrum or Amstrad machine. This is an *emulator* not a simulator.

For a long time after mastering 6502 machine code I wanted to try Z80 code but I was inhibited by the fact that I'd have to buy another computer to do so. If only this emulator had been available then I would not have had to shell out a fortune on a machine I don't really need.

The YER emulator is really a compiler which takes each Z80 command and translates it into a corresponding piece of 6502 code from a library stored on disk. It's a bit like Basic really in the sense the interpreter takes the Basic keyword and executes a corresponding piece of code. The result is that the program runs more slowly than a dedicated machine code equivalent as is the case with this emulator. A compiled Z80 program runs at about a sixth of the speed of a dedicated 6502 routine. Not that this matters a great deal as long as it runs well enough to show if the Z80 coding would work.

The Z80 assembler is a lot more flexible than YER's 6502 equivalent and includes facilities such as search and replace, a simple delete command, hex/decimal/binary calculator and a complete DOS support.

The actual assembler listing follows almost the same conventions as laid down by the 6502 assembler except that the code follows the correct Z80 mnemonic system.

Any emulation of one CPU by another is liable to compromises in the interests of speed and efficiency. In this case only the essential Z80 flags are supported, carry, zero and interrupt. With the exception of the IR pair all of the CPU registers are supported including the twin alternative set of registers. The net effect of these omissions is that some of the commands cannot be supported by the emulator. This is limited to 20 specific commands and doesn't cause any problems in learning Z80 code.

After writing your code in the assembler editor you then save it to disk and load the compiler program. The compiler produces the object code which in turn is converted into the final 6502 version by the special saver program.

This is a novel and relatively cheap way of becoming familiar with the Z80 environment.

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Games Reviews

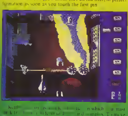
A look at the latest selection of games available

ACTION PACK 3

The Action pack series are compilations of Alligata programmes that are sold exclusively through W H Smith. This, the third in the series, contains the Commando style shoot 'em up Who Dares Wins II, an odd arcade game called Kettle, the terrible Indoor Bowling and superb Trap.

In Who Dares Wins II you're a man with a mission, a machine gun and eight grenades. Your objective is to single handedly take enemy outposts and free any of your comrades that need your unique (blast everything) help.

Indoor Bowling is a ten pin bowling style of game but it lacks four pins and any point. The six pins that are there to be bowled over defy most of the laws of physics when they move as when you get a strike they all fall over, in perfect formation as soon as you touch the first pin.



Kettle [illegible] in which [illegible] must [illegible] and [illegible] complex. To move [illegible] hidden [illegible] constant [illegible] detected by [illegible] be [illegible] wipe [illegible] fun to play [illegible]

The final game, Trap, is undoubtably the best of the compilation and after a simple but ship expensive [illegible] through an asteroid belt becomes a Zaxxon style game [illegible] which you must zap aliens, disable lasers, collect fuel, shoot spy eyes (if these escape they alert the dreaded p[illegible] craft) all to collect orbs to gain a better ship to survive a harder course.

The skill of the game (apart from surviving) is to plan your attacks so that you take out the levels aliens first (there's only a set of quota of aliens per level) before blasting the boats and lasers to get through to the end of the zone where you have to proceed on foot past walkways to claim your orb. A great shoot 'em up in the finest tradition.

Trap and Who Dares Wins II are the games worth considering in this compilation and the others should be viewed as a bonus. If you've got neither then it's worth a look but if you've already got one of these think again.

T H

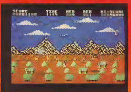
Touchline
Title. *Action Pack 3* ***Supplier*** *Alligata, Orange Street, Sheffield S1 4DW* ***Tel*** *0742 755796* ***Machine*** *C64* ***Price*** *£4.99* ***Originality*** *5/10* ***Playability*** *7/10* ***Graphics*** *6/10* ***Value*** *5/10*

[illegible]

rooooooaw, daka daka bo[illegible] I've just been playing the new [illegible] Runner and I'm hoo[illegible]

You play [illegible] rescue your [illegible] blown to bits [illegible] enemy planes [illegible] are their onl[illegible] down all airc[illegible] importantly [illegible]

Your helic[illegible] winch and with [illegible] around and level [illegible]



[illegible] [illegible] [illegible] are adequate. The end result is a highly playable, addictive, well-presented game and at just under two pounds it's excellent value. Hats off to Power House. **K R**

Touchline
Title *Gun Runner* ***Supplier*** *Power House 204 Worple Road London SW20 8PN* ***Tel*** *01 879 7266* ***Machine*** *C64* ***Price*** *£1.99* ***Originality*** *6/10* ***Graphics*** *9/10* ***Playability*** *9/10* ***Value*** *10/10*

DEMOLITION

*D*emolition is a breakout/arkanoid style of a game in which you must guide a ball with a bat around a series of screens [illegible] walls of bricks.

LEVEL 02
BALLSPEED 4

[illegible] the left [illegible] If a ball [illegible] clear all the [illegible] [illegible] as it [illegible] have [illegible] effect [illegible]

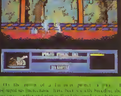
[illegible] which the number of times you must [illegible] to destroy it and others give [illegible] bonus points and lives and some change the size and speed of your bat. One reverses your bat controls while [illegible] the [illegible] the [illegible] [illegible] the bat [illegible]

[illegible] a good variant of the tried and tested [illegible] that first appeared in the arcades over [illegible] **T H**

Touchline
Title *Demolition* ***Supplier*** *[illegible]* ***Machine*** *C16/Plus/4* ***Price*** *£7.99* ***Originality*** *2/10* ***Playability*** *7/10* ***Graphics*** *5/10* ***Value*** *7/10*

[illegible]

*O*ut in the far reaches of space, in the farthest Galaxy, a huge money war is being pledged. Well, not exactly money, but space birds known as griffins. You see as this bird was acclaimed a galactic delicacy and acquired such value it came to be used as an extremely valuable unit of intergalactic currency, traded on the stock market of the universe.



On the [illegible] of [illegible] is [illegible] [illegible] unscrupulous mercenaries have been secretly breeding the [illegible] space griffin and plan to flood the market with them. This would of course throw the monetary system up in the air, allowing them to seize over all power.

This can not be allowed to happen so Starfleet command decided to send Neil Armstrong to wipe out this dirty trick and anyone caught breeding them. But due to an error in the communications computer the dodgy Captain Rover Armstrong was sent instead. Of course he is [illegible] inexperienced but the task is simple enough, just capture or [illegible] all the griffins on the planet. The griffins [illegible] [illegible] and promptly make themselves scarce. In his quest [illegible] Captain Rover gets help from the [illegible] supplies to help catch the birds, such as food. When you are [illegible] the griffin press the button [illegible] right to the [illegible]

[illegible] too close, just [illegible] weapon push the button and POW feathers fly [illegible]

There are loads of different traps and such like [illegible] with [illegible] strategy

[illegible] this game represent [illegible] good [illegible] sound (Robb Hubard), amazing parallax background

I don't need to tell you to buy. I bet you're putting on your coat now so go on then get down to your local software shop

K R

Touchline
Title *[illegible]* ***Supplier*** *[illegible] Bear Brand Complex [illegible] Road Woolton Liverpool Merseyside L25 7SF* ***Tel*** *051 428 9393* ***Price*** *£5.99* ***Originality*** *7/10* ***Graphics*** *9/10* ***Playability*** *8/10* ***Value*** *9/10*

ROAD RUNNER

Beep Beep. Stopping only for a quick peck of corn Road Runner zooms off into the distance leaving only a cloud of dust behind while the hapless Wile E. Coyote is left to suffer the consequences of his latest backfired plan. That is [illegible]

[illegible]

[illegible] Although a nice idea, [illegible] really lacking in playability on the [illegible] although [illegible] be [illegible]

[illegible] load in one by one. If Road Runner had to wait this long, he would have been barbecued long since

If you can put up with the problems of [illegible] tape the game itself seems to be a competent version of the arcade version and fans will no doubt want to buy a copy. Otherwise it's a case of try before you buy [illegible]

G R H

Touchline
Title *Road Runner* ***Supplier*** *[illegible] Holdford Way Holdford Birmingham B6 [illegible]* ***Tel*** *021 356 3388* ***Machine*** *C64* ***Price*** *£9.99 (c) [illegible] (d)* ***Originality*** *[illegible]/10* ***Graphics*** *[illegible]/10* ***Playability*** *[illegible]* ***Value*** *6/10*

[illegible]

At last First Star the makers of the famous Rockford character have released Bouldersash I and II at only £2.99 each

I was pretty chuffed as I was never able to get hold of the first game which was very good. I wondered why they had waited so long to release it?

Anyway for those of you who have not heard of these games I'll tell you more. There was a little guy called Rockford and he liked nothing better than collect precious gems and valuable rocks

One day while out walking his dog he stumbled across a cave and being of a curious nature he decided to investigate. He sent his dog home and went in and was amazed at what he saw – huge gems and jewels stuck in the ground,, so not to miss the big chance he started to collect the gems, when he had them all he heard a strange noise and noticed that the entrance was gone and a new one had appeared. So in he

12 10 0 125 000040

[illegible] up with giant Amoebas, huge [illegible] through the [illegible] Then R[illegible]rd has [illegible] minutes he is nearby tapping his feet when POW the green slime bang and turns into jewels 'Wow!' he says 'I must have suffocated it.' Quite a good idea though.

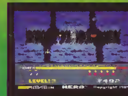
You should have the idea by now – Boulderdash and Rockfords Riot are just [illegible] think-effect dodge games and prove very taxing on the old grey matter. If you do not have any of these two games then go and get them. They are very good value and you should think yourself lucky that you did not buy them two years back when you would have paid just under a tenner. Good graphics, nice sound, decent gameplay and brilliant value, which is surely enough reason to add these to your collection. **K R**

Touchline
Title *Boulderdash/Rockfords Riot* ***Supplier*** *Prism Leisure Unit 1 Enfield Middlesex EN1 1SJ* ***Tel*** *01-804 8100* ***Price*** *£2.99 (each)* ***Originality*** *6/10* ***Playability*** *9/10* ***Graphics*** *7/10* ***Value*** *9/10*

HERO

You are Roderick Hero, ace member of the Helicopter Emergency Rescue [illegible]. All you know is that there is a miner trapped [illegible] underground by a freak explosion and that [illegible] of time in which to rescue him.

A [illegible] old Activision game which [illegible]



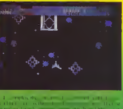
[illegible] of increasing [illegible] Ro[illegible] way and must either be mined or shot through. Strange creatures appear [illegible] and must be shot or dodged such as spiders [illegible] as you pass. A[illegible] plunge the caves into [illegible] by guesswork – very [illegible] result in the immediate loss [illegible] All you have to do then is to make sure that you don't plunge your helicopter into the icy waters. The added time pressure does little to help either.

The game looks more than a little dated now (not surprisingly really) and is graphically crude. For all that there is still an initial addiction but once you start remembering where all the hazards are that also wears off soon. **G R H**

Touchline
Title *Hero* ***Supplier*** *[illegible] House Upper St Martins Lane London WC2H 9DL* ***Tel*** *01 [illegible] 5206* ***Machine*** *C64* ***Price*** *£1.99* ***Originality*** *3/10* ***Graphics*** *3/10* ***Playability*** *4/10* ***Value*** *4/10*

TERRA NOVA

If you need to flex your fire button finger then load in Terra Nova and get zapping. It's a no frills shoot 'em up in which you have four zones to clear. In Terra Nova 'clear' means blast everything to smithereens.



To complete the [illegible]

[illegible] that [illegible] which [illegible] that [illegible]

[illegible]

A fun shoot em up that you'll enjoy but don't expect too much

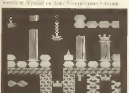
T H

Touchline

***Title** Terra Nova **Supplier** Anco 35 West Hill Dartford Kent DA1 2EL **Tel** 0322 92513/8 **Machine** C16/Plus/4 **Price** £7.99 **Originality** 6/10 **Playability** 6/10 **Graphics** 5/10 **Value** 5/10*

REALM

Reconstructing the entire solar system is the minor task facing you. The Planetary Orbiting Co-ordinator has developed a serious malfunction and planets are scattered everywhere. You must control an XR3 droid and [illegible] the [illegible] Co-ordination Sanctum.



In other words the [illegible] is a large maze and you must wander around it collecting objects and solving problems. As [illegible] progress you must relocate the nine planets in their correct place around the sun.

Not all areas of the maze are immediately accessible to you. Walking past certain points causes doors to spring shut behind you, trapping you if you have not taken sufficient care over your route. Arrows point the way but their main use is that when you stand next to them they cause doors to open elsewhere in the maze, causing a lot of backtracking. As your progress further so there are items to be collected which are then used to remove further obstacles in your path.

The maze is constructed of brightly coloured blocks and designs – graphically simple but effective enough. Certain blocks are lethal to touch but it shouldn't be too difficult to work out which ones they are as skull and crossbones usually tend to conceal something nasty!

Lack of any sort of action is likely to limit the appeal of Realm to maze fans but it's not a bad game for the price.

G R H

Touchline

***Title** Realm **Supplier** Firebird Silver Wellington House Upper St Martins Lane London WC2H 9DL **Tel** 01 631 5206 **Machine** C64 **Price** £1.99 **Originality** 5/10 **Graphics** 5/10 **Playability** 6/10 **Value** 6/10*

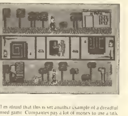
LAUREL AND HARDY

Laurel and Hardy have had a tiff. Nothing unusual in that you may say, they had at least one in every film that they made. Still, satisfaction is demanded and can be settled in the only way slapstick comedians know how – a custard pie in the face.

So Stan and Ollie set off round a strange town in search of the local flan emporium. On their way they will find plenty of opportunities to collect objects and use them to hinder the other – ball bearings, oil and broken glass. Just the sort of things an unsuspecting person can trip up on. Other features include riding on a bike to speed up your movement, recruiting the dubious services of a small dog and the presence of the Keystone Kops.

The screen is divided into three sections. The top shows Ollie's current whereabouts. All movement is shown on an east-west axis regardless of which way you are actually heading. As this is rather confusing it is strongly recommended to get a map. Likewise, the bottom half of the map is used for Stan. You can play either character against the computer or a friend.

The central area shows a picture of each character together with a series of icons indicating what he is currently carrying. The colour of your face shows how thirsty you are. You have to stop off occasionally to take on board liquid refreshment – non-alcoholic of course.



I'm afraid that this is yet another example of a dreadful licensed game. Companies pay a lot of money to use a title like this and are obviously eager to get something onto the market to recoup their investment as quickly as possible. All this pressure can only squeeze one thing – the game, and it shows. In Laurel and Hardy the action is spread over too great a distance which makes the gameplay extremely tedious in the extreme. Less than adequate game control and display don't help either. The result is a poor man's Spy versus Spy.

Perhaps if software houses took the time and money to employ the services of a games designer and graphic artist rather than expect the poor programmer to come up with ideas, graphics and music as well as code everything, licensed games might have a better reputation. With Laurel

and Hardy as Ollie might have said Here's another fine mess
G.R.H.

Touchline
***Title** Laurel and Hardy **Supplier** Advance Software 17 Staple Tye Harlow Essex CM18 7LX **Tel** 0279 412441 **Machine** C64 **Price** £9.95 **Originality** 5/10 **Graphics** 5/10 **Gameplay** 3/10 **Value** 2/10*

ZYNAPS

Zynaps is the latest shoot 'em up from Hewson in which you must fly your Scorpian fighter through screen after screen of alien spacecraft command ships mother ships and planet installations that shower you in homing and seeker missiles

Your Scorpion fighter is fitted with a standard missile launcher but also a fuel scoop that can absorb the energy capsules left after a wave of aliens or ground installation is destroyed Collect enough of these and you could activate other weapon systems such as more speed greater firepower bombs and homing missiles

At the end of each sequence you will have to fight your way past a mothership or a command vessel that can only be destroyed by several well-timed shots or by homing missiles

As you blast aliens and avoid their missiles as well as the background structures (that are just as deadly) your ship will get stronger and stronger but so will the opponents you'll face

Although Zynaps will give your fire button finger a good work out it is a little more than a Nemesis variant It's good but we've come to expect more than this from Hewson

T.H.

Touchline
***Title** Zynaps **Supplier** Hewson Consultants 56B Milton Trading Estate Milton Abingdon Oxon OX14 4RX **Tel** 0235 832939 **Machine** C64 **Price** £8.99 (ca) £12.95 (d) **Originality** 5/10 **Playability** 7/10 **Graphics** 6/10 **Value** 7/10*

ZOLYX

Do you remember an arcade game called Qix that was then converted for every machine possible in a bewildering array of names that all ended in the letter X? Now here comes Zolyx which is the same old annoyingly addictive game that I just can't stop playing

The game is incredibly simple All you have to do is paint 75% of a screen by moving your zolyx and boxing off sections which then turn blue

Naturally there's a catch in the shape of zolyx zapping balls that cost you a life if they either collide with you or a box that you're drawing with the white line that follows your movements in clear territory Lose your lives and you lose the game

If you manage to complete a screen then you're rewarded with a bonus life and you're onto the next screen which has even more balls to avoid

A simple but ridiculously addictive game **T H**

Touchline
***Title** Zolyx **Supplier** Firebird Wellington House Upper St Martins Lane London WC2H 9DL **Tel** 01-631-5206 **Machine** C64 **Price** £1.99 **Originality** 2/10 **Playability** 7/10 **Graphics** 4/10 **Value** 7/10*

TABLE FOOTBALL

Have you ever played those table football games where the pieces are controlled by turning handles? Well now you can bring the excitement into your home and onto your computer screen at a budget price

The game is only a two player game in which left and right joystick pushes move the selected bar (this is the one nearest the ball) and forward and back to kick

The game is a best of nine goals match with the current score displayed on the pitch and not in the oceans of room above the table

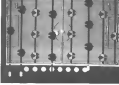
Budgie isn't the first software house to attempt to computerise table football indeed Bubblebus produced a good version called Kick-off This is not a good version for two annoying reasons

Firstly all the players look as if they're standing upright but aren't as the ball will pass under them unless you kick it This is of course nonsense and spoils the game as well as stopping the players trapping and controlling the ball and turns the game into a kicking match Secondly should you score a goal (these can sometimes be scored by kicking the ball past the post??) your opponent may get the goal or occasionally both of you get it!

Even if the program wasn't bugged it just wouldn't be worth the money even at a budget price

T H

Touchline
***Title** Table Football **Supplier** Budgie 1 Orange Street Sheffield S1 4DW **Tel** 0742 755796 **Machine** C64 **Price** £1.99 **Originality** 3/10 **Graphics** 4/10 **Playability** 6/10 **Value** 4/10*



The Personal Choice Collection

A trio of packages for the home or small business user which includes a word processor, database and spreadsheet program that can be used separately or integrated through common files

By Tony Hetherington

The collection is supplied in a library box set with each program accompanied by a quick reference guide. Also a full manual is provided complete with worked examples and tutorial sections that takes you through the basic operating instructions, and then onto advanced features and finally how to interface with the other programmes in the collection.

Writer's Choice

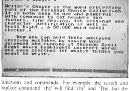
Writer's Choice is a full blooded word processor capable of handling complex documents with headers and footers, justification search and replace, formating and a 50,000 word spell checker!

Once Writer's Choice has loaded, you are presented with a menu to write a document, format a page, LOAD, SAVE or PRINT a document or format a blank disk or produce a test print. You can then easily write a letter, memo or magazine article and correct typing mistakes, copy, move or delete blocks of text by pressing a few keys.

A Writer's Choice document can consist of 600 40 character lines that appear on the screen as dots until they are over-types. That should be enough for most applications but if it isn't you can chain documents together to form massive documents that can be printed out on almost every combination of printers and interfaces.

You can also read in files created by Filer's Choice and Planner's Choice and incorporate them into reports or use the Filer's Choice data to form a mailing list.

Writer's Choice is probably one of the easiest word processors I have ever used (there's always a help key in reach if you get stuck) yet it possesses some complex functions and commands. For example, the search and replace command 'the' will find 'the' and 'The' but the command '/the' is even more powerful as it finds part words such as 'there' and 'whether'.



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Writer's Choice ♦

Writer's Choice is the word processing
part of the Personal Choice Collection.
It is both easy to use and powerful
with commands to set headers and
footers, line spacing, tab settings and
character justification as well as
Spell Right , a 50,000 word spell
checker.♦

     Now you can avid those anniying
spelling mistakes by saving your
document and running it through Spell
Right which highlights incorect words
and even searches for whatit thinks you
meant to write.
```

Once you've created your letter, memo or article you can preview to see what it will look like on paper and then check it with the impressive Spell-Right and get a word and character count.

Spell-Right is supplied on a separate disk so you must save your document and then load it in for checking. The Spell-Right disk is double-sided and both must be used in turn to check words that begin with letters between A and N and O and Z. This takes a while particularly if you've added your own dictionary to the 50,000 words that are already checked.

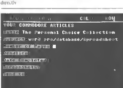
Once the program has finished it highlights any words it can't find. These can be altered, ignored or added to another dictionary. If you don't know how to spell a word you can have another go and have that checked or you can even get Spell-Right to list all the similar words it can find for you to choose between!

Filer's Choice

Every integrated package needs a database program to store and organise information so that it can be updated, sorted into order and then printed out by the word processor.

A Filer's Choice database consists of records that are created by typing on a screen and can be between 20 and 80 lines long. To create a database you simply have to type on the screen the records you want to keep and then save them to disk. You can then add new entries, delete records or edit existing ones, sort the whole file into alphabetical order (to whatever is defined at field 1) and search for a specific record or group of records by setting greater than and less than parameters.

Once you have the information stored in a format that's easily edited and updated you'll want to do something with it such as create mailing lists and print out labels and other reports or lists. Creating a report is easy as the program presents you with a list of the fields in each record in your file and all you have to do is put them in the order you want them on your form. You don't have to include all of them (indeed a useful printout is a list of phone numbers) and you can signal the computer to print more than one on the same line. This report or print out can then be displayed on the screen, saved to disk to be used with Writer's Choice or printed out directly.



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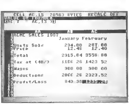
                              COL       ROW
YOUR COMMODORE ARTICLES
Title: The Personal Choice Collection
Subject: word pro/database/spreadsheet
Number of Pages: █
Deadline:
Date Completed:
Screenshots?
Send to:

     Save          Repeat Last          Help
```

Planner's Choice

Planner's Choice is the third and final part of this application program package and features a fully fledged spreadsheet program for planning your finances and asking those "what if" questions. What if VAT goes up, what if the cost of disks doubles, what if I sell 20% more games, what will happen to the price Mega Game 3? The answers and many more can be posed and answered by a spreadsheet.



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 CELL AC,15   28563 BYTES   RECALC OFF
VALUE OR FORMULA
(AC 7    AC,13 )

           AA            AB       AC
 1ACME SALES 1987
 2                  January February
 3
 4Units Sold         234.00   287.00
 5Price               12.46    12.40
 6
 7Total             2915.04  3558.80
 8
 9Tax at (40%)      1166 26  1423 52
10
11Wages              900 00   900 00
12
13Deductions        2066 26  2323.52
14
15Profit/Loss        849 38  1235.28
16
17
18
19
```

The uses and applications of a word processor and a database are obvious but who would use or need a spreadsheet? The answer is that you don't need a multi-million pound budget to gain from using a spreadsheet. Club treasurers, comparing investments or home and tax accounts are all made easier by using a spreadsheet and even if you're planning to run your own business a spreadsheet printout will impress the bank manager.

Unfortunately the spreadsheet screen looks daunting with only a few lines that outline the cells of the programmes work space. By using the Planner's Choice manual you'll learn that each of these cells can contain text (a heading so that you understand what's going on), figures and formulas to add up the contents of other cells or perform calculations. With these you can add up the subscriptions you've received, deduct the heating and lighting bills and rent of your club house and find out how much you've got left for trips or equipment and see whether this figure is increasing or decreasing, in which case you'll have to increase your subs. Similarly a businessman can calculate profits, expenses and wages to set prices to keep the taxman at bay and be ready for any crisis such as the Chancellor deciding to put up beer, petrol or VAT.

By changing a single figure you can create a whole different set of circumstances which the program can recalculate in seconds giving you the new results and a jump ahead of the opposition.

Once your spreadsheet is complete you can either save it to disk and incorporate it into a word processor document or print it out individually directly from Planner's Choice.

The Personal Choice Collection is a powerful trio of packages that will put your C64 to work. There is also C128 versions that load automatically from disk that basically extend the screen size from 40 to 80 characters. The collection is a little expensive at £69.95 but does contain all you need to write documents and check the spelling, store information and get your finances into shape. The packages are easy to use and are supported by some superb documentation.

Touchline

Name *The Personal Choice Collection* ***Supplier*** *Personal Choice Software* ***Tel*** *01-431 1101* ***Machine*** *C64* ***Price*** *£69.95*

42
SWOOPER
DIABLO
HOLLYWOOD
ATARI ST
POKER
DIAMOND

SWOOPER
Special report from remote space outpost [illegible] ... Super fast scrolling arcade game, brilliant sound.
Atari ST £19.95 Amiga £19.95

DIABLO
The object is very simple really. You slide pieces of track in front of a moving ball and as it passes over a section of track the track disappears. You just have to keep the ball rolling until all the track is gone. Graphics are simple but effective, sound is nice and the [illegible] easy to use. It's also so maddeningly addictive that it [illegible] you a one way ticket to the funny farm.
CBM 64 disc £9.95 Atari ST £19.95 Amiga £19.95

HOLLYWOOD POKER
Hollywood Poker is a high class strip poker with the help of digitised graphics. Play poker against beautiful girls, [illegible] Germany! When your partner loses money she has to take off her clothes. You can choose between four different girls. Try your luck.
CBM 64 cassette £6.95 CBM 64 disc £12.95 Atari ST £19.95 Amiga £19.95

ORDER FORM YC

Please send me ______ copies of
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Arcade Action

Producing your own scrolling messages and plotting on the screen.

By Tony Crowther

Scrolling messages have become commonplace within game programs Such messages can range from game instructions to amiable slanders about friends and other programmers. Here's a routine that allows you to scroll a message up to 255 characters long across the top of the screen

Drawing borders and lines, and doing it quickly, is very important in games writing So I've also presented a routine that enables you to plot small blocks extremely quickly at any point on the screen

Get It Scrolling

The routine presented here for scrolling messages is nothing to jump up and down and shout about However it is a simple but effective way of producing your own scrolling messages

As usual there are three programs associated with the message scroll routine Firstly, we have the Basic loader, called 'MESSAGE LOADER' This routine holds the necessary machine code within Basic DATA statements These are then POKEd into the correct area of memory when the program is RUN The second listing 'MESSAGE M/C' is an assembly version of the program so that those of you interested in machine code can see how the program works The third routine, 'MESSAGE DEMO' is a simple demonstration that shows the program in operation

Using The Routine

The scrolling is extremely simple to use and should cause you no problems It does require the IRQ DATABASE routine to be in memory before you RUN For those of you who missed the IRQ DATABASE in the March 1987 issue of Your Commodore I have included it here To use the routine you should follow this procedure

1) POKE 839 0
2) Clear the screen.
3) Print the message on the screen (255 characters long)
4) Type SYS 50817, COLOUR SPEED
5) Clear the screen
6) POKE 839, 1 to return the message on

The values for COLOUR are the normal colour codes as described in your manual

SPEED should be between 0 and 8 where 0 means stop and 8 is fastest

If you are still unclear as to what you should do read the example — it should make things clearer

Screen Plotting

The second routine presented here allows you to place a quarter character sized block, 4 x 4 pixels at any specified position on the screen in any colour

At first glance this routine will appear to be of little use in arcade programming, however it will become invaluable when drawing borders or lines on the screen

Once again three programs are presented The first, 'PLOT LOADER' is the Basic loader for the PLOT routine The second program 'PLOT M/C', is the machine code version of the program As usual a demonstration is included 'PLOT DEMO' showing the program in use The syntax for this routine is as follows

SYS 50616 X Y COLOUR

where X is the range 0-79 and is the horizontal co-ordinate for the dot Y is in the range 0-49 and is the vertical co-ordinate of the dot

Colour is a standard colour code (0-15)

Brought Forward

In the last gripping episode I set you a couple of tasks to perform with the routines that I had already published I am sure that you all managed to carry out the specified tasks without too many problems Just in case you didn't I have included here my versions of the programs

The first program 'DEMO EXTENSION' links together the two sprite routines and produced animated moving sprites The second routine 'HELI DEMO' moves last month's sprite around the screen

If you couldn't get your own sprites moving then following these programs through should make life easier

REMEMBER before you RUN any of these programs you must have the relevant routines from my previous articles in memory or your computer will crash

```
1000 ;******************************
1010 ;****  SCROLLING MESSAGE  ****
1020 ;******************************
1030 ;
1040 JUMPTB   = 49240       ;JMP [illegible]
1050 BASIC1   = 44797
1060 BASIC2   = 44446
1070 BASIC3   = 47095
1080 PAGE     = 20
1090 DATA     = 49572
1100 COLOUR   = 49571
1110 SPEED    = 49570
1120 FLAG1    = 49529
1130 XFLAG    = 49528
1140 RASTCD   = 49527
1150 TEST     = 49526
1160 SCREEN   = 1024
1170 FLAG     = 879
1180 COLSCR   = 55296
1190 RASTER   = 53266
1200 XPOS     = 53270
1210 IRQOUT   = 60033
1220 *        = 50817
1230 ;
1240 PROG1
1250          JSR BASIC1       ;GET COLOUR
1260          JSR BASIC2
1270          JSR BASIC3
1280          LDA PAGE
1290          STA COLOUR
1300          JSR BASIC1       ;GET SPEED
1310          JSR BASIC2
1320          JSR BASIC3
1330          LDA PAGE
1340          CMP #9           ;CHECK FOR 8 MAX
1350          BCS EXIT
1360          STA SPEED
1370          LDA # PROG2      ;CHAIN PROG2 TO IRQ
1380          STA JUMPTB
1390          LDA # PROG2
1400          STA JUMPTB+1
1410          LDX #1
1420          STX XFLAG
1430          LDX #0
1440          STX RASTCD
1450          STX FLAG1
1460 LOOP1
1470          LDA SCREEN,X     ;STORE MESSAGE IN
1480          STA DATA,X       ;MEMORY
1490          INX
1500          BNE LOOP1
1510 EXIT
1520          RTS
1530 ;
```

```
1540 ;
1550 PROG2
1560          LDA FLAG         ;[illegible]
1570          BEQ EXIT
1580          INC RASTCD       ;FASTER [illegible]
1590          LDA RASTCD
1600          BEQ NEXTFG
1610          LDA #[illegible] ;RE SET XSCROLL
1620          STA XPOS
1630          LDY FLAG1        ;POSSION IN DATA
1640          LDX #0
1650 LOOP2
1660          LDA COLOUR       ;STORE COLOUR ON
1670          STA COLSCR,X     ;SCREEN
1680          LDA DATA,Y       ;STORE DATA ON
1690          STA SCREEN,X     ;SCREEN
1700          INY
1710          INX
1720          CPX #40
1730          BNE LOOP2
1740          LDA #255         ;RE SET COUNT
1750          STA RASTCD
1760          LDA #255         ;NEXT FASTER AT 255
1770          STA FASTER
1780          RTS
1790 NEXTFG
1800          LDA #56          ;NEXT FASTER AT 56
1810          STA FASTER
1820          LDA XFLAG        ;ADD SPEED TO XSCROLL
1830          SEC
1840          SBC SPEED
1850          BPL NEXT2        ;CHECK BIT 8
1860          CLC
1870          ADC #8
1880 NEXT2
1890          STA XFLAG
1900          STA XPOS
1910          LDA XFLAG
1920          SEC
1930          SBC SPEED
1940          BPL NEXT3
1950          INC FLAG1
1960 NEXT3
1970          PLA              ;REMOVE JSR FROM
1980          PLA              ;STACK
1990          JMP IRQOUT       ;JUMP OUT OF IRQ
2000   .END
```

PROGRAM SPRITE DEMO

```
BB  100 REM *************************
    ********
B5  110 REM * DEMONSTRATION OF M
    OVING  *
E9  120 REM * A SPRITE ACROSS TH
    E      *
85  130 REM * SCREEN USING ROUTI
    NES    *
A9  140 REM * FROM  ARCADE ACTIO
    N      *
3D  150 REM *
           *
1F  160 REM * NOTE  THE FOLLOWIN
    G      *
ED  170 REM * PROGRAMS MUST HAVE
     BEEN  *
33  180 REM * RUN BEFORE YOU THY
     THIS  *
C0  190 REM * DEMO
           *
77  200 REM *
           *
A0  210 REM *      IRQ DATABASE
           *
53  220 REM *      SPRITE ANIM L
    OAD    *
A3  230 REM *      SPRITE MOVER
    LOAD   *
1F  240 REM *********************
    ********
9D  250 POKE 53280  0
6D  260 POKE 53281  0
8A  280 PRINT (CLR DOWN8 C5 SPC6
    )SPRITE MOVEMENT DEMONSTRATI
    ON'
40  290 REM *** THIS IS THE SPRI
    TE DATA ***
08  300 REM *** DATA FOR SPRITE
    ONE     ***
0C  310 DATA 0 0 0 0 0 0 0
98  320 DATA 248 56 3 255 244 31
     255
A4  330 DATA 255 63 254 56 127 2
    52 0
82  340 DATA 255 248 0 7 248 0 2
    9
00  350 DATA 240 0 1 240 0 3 240
2A  360 DATA 0 3 240 0 3 240 0
91  370 DATA 1 224 0 1 224 0 1
FD  380 DATA 224 0 0 224 0 0 96
BD  390 DATA 0 0 32 0 0 0 0 0
3E  400 REM *** DATA FOR SPRITE
    2       ***
8A  410 DATA 0 0 0 0 128 0 1
66  420 DATA 128 0 3 128 0 7 192

55  430 DATA 0 15 192 0 15 192 0

48  440 DATA 15 192 0 15 224 0 1
    5
B0  450 DATA 224 0 7 240 0 7 240

43  460 DATA 0 3 248 56 3 255 24
    4
A5  470 DATA 31 255 255 63 254 5
    6 127
16  480 DATA 252 0 255 240 0 3 1
    92
69  490 DATA 0 14 0 0 0 0 0 0
C2  500 REM *** POKE SPRITE DATA
     INTO   ***
35  505 REM *** SPRITE POSITIONS
```

```
    128/9 ***
34  510 FOR X = 0 TO 127
EC  520 READ A
22  530 POKE X + ( 128 * 64 ) +
    A
E3  535 NEXT X
6C  550 POKE 2040 128 REM POINTE
    R FOR SPT 0
CA  560 POKE 2041 128 REM POINTE
    R FOR SPT 1
A2  800 SYS 49152 REM TURN ON IR
    Q DBASE
3E  810 POKE 837 1 REM TURN ON
    SPRITE MOVE
91  820 POKE 53269 255 REM ENABL
    E SPRITES
75  830 POKE 53287 15 REM SET SP
    RITE COLOUR
F8  840 SYS 50180 0 20 200 0 3 1
     500 REM    START THE MOVEME
    NT
EE  890 POKE 838 1 REM TURN ON A
    NIMATION
5B  900 SYS 50480 0 128 2 25 REM
     START THE  MOVEMENT OF SPRI
    TE
```

PROGRAM DEMO EXTENSION

```
8B  100 REM ********************
    ********
85  110 REM * DEMONSTRATION OF M
    OVING  *
0E  120 REM * AND ANIMATING SPRI
    TES    *
64  130 REM * USING ROUTINES FRO
    M      *
78  140 REM *  ARCADE ACTION
           *
3D  150 REM *
           *
1F  160 REM * NOTE  THE FOLLOWIN
    G      *
ED  170 REM * PROGRAMS MUST HAVE
     BEEN  *
33  180 REM * RUN BEFORE YOU TRY
     THIS  *
C0  190 REM * DEMO
           *
77  200 REM *
           *
A0  210 REM *      IRQ DATABASE
           *
53  220 REM *      SPRITE ANIM L
    OAD    *
A3  230 REM *      SPRITE MOVER
    LOAD   *
1F  240 REM ********************
    ********
9D  250 POKE 53280  0
6D  260 POKE 53281  0
4D  270 PRINT [CLR]
8F  280 PRINT [HOME DOWN8 C5 SPC
    6]SPRITE ANIMATION DEMO"
DD  290 REM ** SET UP THE SPRITE
     SHAPES **
32  300 FOR I =0 TO 64*3
E1  310 POKE I +( 128 *64 )  255

AA  320 NEXT I
72  330 FOR J = 3 TO 358 STEP 60

B7  340 FOR I = 3 TO 21 STEP 3
A6  350 POKE I+J +( 128 *64 ) ,1
    95
42  360 NEXT I
58  370 NEXT J
18  380 SYS 49152    REM START T
    HE IRQ
CE  390 POKE 838  1  REM SWITCH
    ON SPT ANIM
2B  400 POKE 837  1  REM SWITCH
    ON SPT MOVE
F2  410 POKE 2040 +I 128
C0  420 POKE 53287+I 1+1 REM SET
     SPT COLOUR
D6  430 POKE 53269 255   REM SWI
    TCH ON SPT
D2  440 REM ** SET UP NO  OF ANI
    MATIONS ***
3A  450 FOR I = 0 TO 7
CE  460 SYS 50480 I 128 3 I*2+4
3C  470 NEXT I
46  480 REM ** START SPRITES MOV
    ING ***
D6  490 FOR I=0 TO 7
71  500 SYS 50180 I 90 100+I*10
    0 1 4-(I/2) (I+1)*16
D4  510 NEXT I
```

PROGRAM IRQ DATABASE

```
07  100 DATA120 162 0 169 0 157
    63 3 874
B1  101 DATA232 224 192 144 248
    162 0 169 1371
89  102 DATA0 170 157 0 157 157
    0 158 799
92  103 DATA157 0 159 232 208 24
    4 169 81 1250
BA  104 DATA157 88 192 169 192 1
    57 89 192 1236
43  105 DATA232 232 232 224 30 1
    44 239 169 1502
38  106 DATA0 141 14 220 169 82
    141 20 767
76  107 DATA3 169 192 141 21 3 1
    69 0 698
7D  108 DATA141 18 208 189 27 14
    1 17 208 929
2B  109 DATA169 1 141 25 208 141
     26 208 919
4A  110 DATA88 96 169 1 141 25 2
    08 32 760
80  111 DATA81 192 32 81 192 32
    81 192 883
19  112 DATA32 81 192 32 81 192
    32 81 723
8C  113 DATA192 32 81 192 32 81
    192 32 834
90  114 DATA81 192 32 81 192 76
    49 234 937
88  115 DATA120 169 49 141 20 3
    169 234 905
67  116 DATA141 21 3 169 1 141 1
    4 220 710
47  117 DATA169 121 141 25 208 1
    69 240 141 1214
97  118 DATA26 208 88 96 169 169
     173 141 1070
2B  200 POKE 53280  0
29  201 POKE 53281  0
5C  202 PRINT [CLR C5]
40  203 A$=  [SPC6]
1A  204 PRINTA$ ****************
    **********
01  205 PRINTA$ *[SPC24]*
6B  206 PRINTA$ *[SPC4]MAIN IRQ
    PROGRAM[SPC4]*
A2  207 PRINTA$ *[SPC5]MEM 49152
     49300[SPC4]*
06  208 PRINTA$ *[SPC24]*
2D  209 PRINTA$ *[SPC24]*
51  210 PRINTA$ *  SYS49152[SPC4
    ]   ON[SPC5]*
07  211 PRINTA$ *[SPC24]*
64  212 PRINTA$ *  SYS49153[SPC4
    ]   OFF[SPC4]*
29  213 PRINTA$ *[SPC24]*
44  214 PRINTA$ ****************
    **********
39  300 LI =100  FOR I = 49152 T
    O 49300 STEP8  T =0  FOR J =
    0 TO 7  READ A
E6  301 POKE I+J  A T =T +A  NEX
    T J READ A IF A<>T THENPRINT
     ERROR IN LINE  LI  END
05  302 LI =LI +1 NEXT I
```

PROGRAM MESSAGE LOADER

```
76  100 DATA32 253 174 32 138 17
    3 32 247 1081
3D  101 DATA183 165 20 141 83 15
    8 32 253 1035
03  102 DATA174 32 138 173 32 24
    7 163 165 1144
0C  103 DATA20 201 9 176 35 141
    82 158 822
9E  104 DATA169 194 141 88 192 1
    69 198 141 1292
D2  105 DATA89 192 162 1 142 80
    158 162 986
80  106 DATA0 142 79 158 142 81
    158 169 949
B9  107 DATA0 4 157 84 158 232 2
    08 247 1090
F3  108 DATA96 173 71 3 240 250
    238 79 1150
CF  109 DATA158 173 79 158 240 3
    9 169 200 1216
A4  110 DATA141 22 208 172 81 15
    8 162 0 944
52  111 DATA173 83 158 157 0 216
     185 84 1056
38  112 DATA158 157 0 4 200 232
    224 40 1015
5E  113 DATA208 238 169 255 141
    79 158 169 1417
C7  114 DATA255 141 18 208 96 16
    9 58 141 1086
63  115 DATA18 208 173 80 158 56
     237 82 1012
E2  116 DATA158 16 3 24 105 8 14
    1 80 535
A2  117 DATA158 141 22 208 173 8
    0 158 56 996
3C  118 DATA237 82 158 16 3 238
    81 158 973
F3  119 DATA104 104 76 129 234 3
    2 253 174 1106
2B  200 POKE 53280  0
29  201 POKE 53281  0
5C  202 PRINT [CLR C5]
40  203 A$=  [SPC6]
1A  204 PRINTA$ ****************
    **********
01  205 PRINTA$ *[SPC24]*
86  206 PRINTA$ *[SPC5]MESSAGE S
    CROLL[SPC5]*
B6  207 PRINTA$ *[SPC5]MEM 50817
     50973[SPC4]*
08  208 PRINTA$ *[SPC24]*
BD  209 PRINTA$ * POKE 839  1[SP
    C12]*
28  210 PRINTA$ *[SPC24]*
BD  211 PRINTA$ * SYS 50817  COL
    OUR[SPC6]*
E7  212 PRINTA$ *[SPC11] SPEED[S
    PC7]*
29  213 PRINTA$ *[SPC24]*
44  214 PRINTA$ ****************
    **********
A9  300 LI =100  FOR I = 50817 T
```

```
    0 50973 STEP8  T =0  FOR J =
    0 TO 7  READ A
E6  301 POKE I+J  A T =T +A  NEX
    T J READ A IF A<>T THENPRINT
    "ERROR IN LINE "L1  END
05  302 L1 =L1 +1 NEXT I
```

PROGRAM MESSAGE DEMO

```
F1  1 REM SWITCH ON IRQ
38  2
5E  3 SYS49152
3E  4
6D  5 POKE 53281  0
81  6 POKE 53280  0
9D  9 REM CLEAR SCREEN
30  10
72  11 PRINT"[CLR]"
36  12
08  13 REM PRINT MESSAGE
75  14 PRINT THIS IS THE MESSAGE
     TO BE SCROLLED ACROSS THE T
    OP OF THE SCREEN
0C  15 PRINT"TO DO THIS  FIRST C
    LEAR THE SCREEN  THEN PRINT
    THE MESSAGE 256
E8  16 PRINT"CHARACTERS LONG  TH
    EN
AE  17 PRINT  SYS50882  COLOUR
    SPEED   THEN CLEAR THE SCREE
    N AGAIN  THEN  POKE
A9  18 PRINT"839 1  TO START  PO
    KE839 0  WILL STOP
3C  19 SYS50817 7 2 REM SET UP S
    CROLL
5E  20 PRINT"[CLR]"
69  21 POKE839 1     REM START SC
    ROLL
40  22 PRINT [HOME C5 DOWN10 RIG
    HT7]SCROLLING MESSAGE DEMO
E3  23 GOTO23
```

PROGRAM PLOT LOADER

```
D0  100 DATA160 0 140 99 159 32
    253 174 1017
9A  101 DATA32 138 173 32 247 18
    3 165 20 990
EC  102 DATA172,99 159 153 92 15
    9 200 192 1226
20  103 DATA4 144 231 169 124 14
    2 200 192 1105
50  104 DATA169,197 141 101 192
    173 92 159 1224
2A  105 DATA170,169 1 157 124 15
    9 169 0 949
37  106 DATA157,116 159 157 148
    159 173 93 1162
4F  107 DATA159 157 100 159 157
    248 7 173 1160
97  108 DATA94 159 157 140 159 1
    73 95 159 1136
CA  109 DATA157 108 159 96 173 7
    0 3 240 1006
25  110 DATA250,162 0 189 124 15
    9 240 42 1166
69  111 DATA254,116 159 189 116
    159 221 108,1322
D2  112 DATA159 144 31 169 0 157
     116 159 935
33  113 DATA254 148 159 189 148
    159 221 140 1416
D5  114 DATA159 144 5 169 0 157
    148 159 941
85  115 DATA189 100 159 24 125 1
    48 159 157 1061
2A  116 DATA248 7 232 224 8 208
    204 96 1227
46  117 DATA244 174 66 159 189 1
    13 198 145 1308
36  118 DATA183 76 100 198 142 8
    7 159 173 1118
3B  119 DATA87 159 45 86 159 208
     13 173 930
DE  120 DATA87 159 24 109 86 159
     170 189 983
0E  121 DATA112 198 145 183 165
    184 24 105 1117
2E  122 DATA212 133 184 173 90 1
    59 145 183 1279
99  123 DATA96 32 126 124 226 12
    3 97 255 1079
61  124 DATA236 108 127 225 251
    98 252 254 1551
D7  125 DATA160 32 253 174 32 13
    8 173 32 994
28  200 POKE 53280  0
29  201 POKE 53281  0
5C  202 PRINT [CLR C5]
40  203 A$=  [SPC6}
1A  204 PRINTA$ ****************
    **********
01  205 PRINTA$ *[SPC24]*
71  206 PRINTA$ *[SPC6]PLOTTER X
     Y[SPC7]*
25  207 PRINTA$ *[SPC5]MEM 50616
    -50816[SPC4]*
06  208 PRINTA$ *[SPC24]*
00  209 PRINTA$ * SYS 50616 XCO
    -OD[SPC6]*
0F  210 PRINTA$ *[SPC11] YCO-OD[
    SPC6]*
39  211 PRINTA$ *[SPC11] COLOUR[
    SPC6]*
32  212 PRINTA$ *[SPC24]*
44  214 PRINTA$ ****************
    **********
4C  300 L1 =100  FOR I = 50616 T
    O 50816 STEP8  T =0  FOR J =
    0 TO 7  READ A
86  301 POKE I+J  A T =T +A  NEX
    T J READ A IF A<>T THENPRINT
     ERROR IN LINE  L1  END
05  302 L1 =L1 +1 NEXT I
```

PROGRAM PLOT DEMO

```
45  0 POKE53280 0
9F  1 POKE53281 0
1C  2 PRINT [CLR C5 DOWN12] TAB(
    13} LO-RES PLOTTER
A8  3 FORI=24TO55
4C  4 SYS 50616 1 22 12
82  5 SYS 50616 1 27 12
84  6 NEXT
AA  7 FORI=22TO27
5A  8 SYS50616 24 I 12
71  9 SYS50616 55 I 12
88  10 NEXT
65  11 FORJ =11TO23STEP3
1E  12 FORI=0TO2*[PI]STEP 5/J
1E  13 A=40-SIN(I)*J*1 7
06  14 B=25-COS(I)*J
C0  15 SYS 50616 A B J
D8  16 NEXTI
DD  17 NEXTJ
F4  18 GOTO18
```

```
1000 *******************************
1010 ****LOW RES GRAPHIC PLOTER****
1020 *******************************
1030
1040 BASIC1   = 44797
1050 BASIC2   = 44426
1060 BASIC3   = 47095
1070 PAGE     = 20
1080 PAGE1    = 183
1090 TEST1    = 40790
1100 TEST2    = 40791
1110 YSTORE   = 40792
1120 XSTORE   = 40793
1130 COLOUR   = 40794
1140 *        = 50616
1150
1160
1170 PROG1
1180          JSR BASIC1      GET X CO-OD
1190          JSR BASIC2
1200          JSR BASIC3
1210          LDA PAGE
1220          STA XSTORE
1230          CMP #80         CHECK FOR MAX
1240          BCS ERROR
1250          JSR BASIC1      GET Y CO-OD
1260          JSR BASIC2
1270          JSR BASIC3
1280          LDA PAGE
1290          STA YSTORE
1300          CMP #50         CHECK FOR MAX
1310          BCS ERROR
1320          JSR BASIC1      GET COLOUR
1330          JSR BASIC2
1340          JSR BASIC3
1350          LDA PAGE
1360          STA COLOUR
1370          JMP LOOP8
1380 ERROR
1390          RTS
1400 LOOP8
1410          LDA #0          EVAL BITS
1420          STA TEST1
1430          STA TEST2
1440          LSR YSTORE
1450          ROR TEST1
1460          LSR XSTORE
1470          ROR TEST2
1480          LDA #1          FIND BYTE
1490          LDX TEST2
```

```
1500        BEQ LOOP1
1510        ASL A
1520 LOOP1
1530        LDX TEST1
1540        BEQ LOOP2
1550        ASL A
1560        ASL A
1570 LOOP2
1580        STA TEST1
1590        LDA #0
1600        STA PAGE1
1610        LDA #4
1620        STA PAGE1+1
1630        LDY YSTORE        FIND SCREEN
1640 LOOP4                    LOCATION
1650        BEQ LOOP9
1660        LDA PAGE1
1670        CLC
1680        ADC #40
1690        STA PAGE1
1700        BCC LOOP3
1710        INC PAGE1+1
1720 LOOP3
1730        DEY
1740        JMP LOOP4
1750 LOOP9
1760        LDY YSTORE        FIND OUT WHATS
1770        LDX #0            ON SCREEN
1780 LOOP5
1790        LDA (PAGE1).Y
1800        CMP DATA X
1810        BEQ LOOP6        .FOUND IT
1820        INX
1830        CPX #16
1840        BNE LOOP5
1850        LDX TEST1
1860        LDA DATA X
1870        STA (PAGE1) Y
1880        JMP LOOP7
1890 LOOP6
1900        STX TEST2
1910        LDA TEST2         COMPARE WITH
1920        AND TEST1         NEW DATA
1930        BNE LOOP7
1940        LDA TEST2
1950        CLC
1960        ADC TEST1
1970        TAX
1980        LDA DATA X        ADD TOGETHER
1990        STA (PAGE1) Y     STORE ON SCREEN
2000 LOOP7
2010        LDA PAGE1+1
2020        CLC
2030        ADC #212
2040        STA PAGE1+1
2050        LDA COLOUR        STORE COLOUR ON
2060        STA (PAGE1) Y     COLOUR SCREEN
2070        RTS
2080
2090
2100 DATA
2110  BYT 32 126 124 226 123 97 255 236
2120  BYT 108 127 225 251.98 252 254 160
2130 .END
```

COMMODORE
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[illegible]

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[illegible]

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[illegible]

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[illegible]

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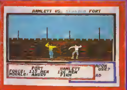
GAME OF THE MONTH

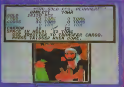
Pirates

[illegible]



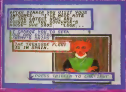
```
HAMLETT VS [illegible] FORT
FORT         HAMLETT        APON
FORCE: 115 MEN   126 MEN     USE?
MORALE: ANGRY    FIRM        RD
```

[illegible]



```
     3540 GOLD PCS. PLUNDER!
     HAMLETT     TOWN
GOLD   16150 PCS
FOOD      43 TONS    0 TONS
GOODS     56 TONS    0 TONS
           0 TON    23 TON
CANNON    18        12
SPACE IN HOLD:  52 TONS
  USE JOYSTICK TO TRANSFER CARGO.
  PRESS TRIGGER WHEN DONE.
```

[illegible]



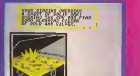
AFTER DINNER YOU VISIT YOUR INFORMER. "I'VE MADE NOTE OF THE LATEST NEWS AND GOSSIP AT THE GOVERNOR'S HOUSE" SHE SAYS. "LOOK ..

I CHARGE YOU TO SEEK OUT AND DESTRO ENEMY'S SHIPS

THE TREASURE FLEET IS IN SPAIN.

PRESS TRIGGER TO CONTINUE

[illegible]



YOUR DIGGING UNCOVERS A CHEST OF SOLID OAK! OPENING THE BOX YOU FIND 6000 GLEAMING PIECES OF GOLD AND SILVER.

[illegible]

Adventure Kit

Want to write a gripping adventure? This series will provide a kit of machine code routines which will simplify the procedure and enable you to develop an individual style. We start off with the location/exit module

As many of you know, there are a number of packages around which are aimed at making adventure writing easier The best known are Quill and Graphic Adventure Creator With these, all you need to do is think up the plot and the rest is done for you The main drawback with these products however, is that the adventures written with them tend to have a similar feel and you are constrained by the imposed limitations of each package

In essence an adventure is a data base which is accessed during the game The tedious part is the need for efficient and rapid access of the data held in it This apsect will be tackled by this kit This will leave you more time to work on the flow of the game and the addition of embellishments

The kit comprises of six modules

1 A location/exit module which allows the handling of the geography of the adventure
2 A text module which handles messages location descriptions, etc
3 An object module which eases such actions as taking dropping eating drinking objects looking and inventory
4 A parser allowing the input of commands and the checking of words against a vocabulary
5 A window module allowing the manipulation of screen windows so that you can erase or scroll different text areas
6 An interrupt module which will build in a real time element into the game

Naturally you don't get something for nothing The machine code will steal about 8K leaving you about 30k for BASIC The routines will, however, give you instant access to 20K of memory for the game database

Each module will be accompanied with an editor allowing you to set up the data base However, I'll go through the setting up of an editor in sufficient detail to allow you to write your own

Location Exit module

All adventures need some way of giving you the power to move about This is done by using locations Each location may be considered to be a room or cell linked to its neighbours by routes It is necessary to specify two sets of data

a) which exits each location has,
b) where each location leads to

This month I will deal with the first set of data and cover the second set at a later date

Ten possible exits are available for any given location These are the eight basic compass directions and up and down These are described in two bytes for each location The first byte has a bit allocated for each compass bearing

North occupies bit 0, north-east occupies bit 1 and so on. This information is held in a table of 256 bytes residing between 37632 and 37887 ($9300-$93FF) Location 0 uses the first byte in the table (37632) and location 255 uses the last byte (37887) Up and down use the first two bits of bytes stored in a table from 37888 to 38143 ($9400 $94FF) This works in the same way as the other table

The destination data occupies rather more memory Each location has ten bytes reserved for it These hold the number of the location reached when moving in any of the ten possible directions If no such route exists the byte value will be zero by default (more on that later) The table starts at $9500 (38144) and occupies as much memory as required by the number of locations used If a full complement of 256 locations is used the table will end at $9F00 (40704) Location 0 uses the first ten bytes, location 1 the next ten and so on

The code in this module uses these tables to provide four functions This routine prints the exits in any given location on the screen The syntax of the command is

SYS 36864, LOCNO, PRINTTYPE X,Y

LOCNO is the location number
PRINTTYPE specifies the form of the display Type 0 prints the exits across the screen using commas to separate them
Type 1 prints the exits in a column in a form suitable for use in a window
X is the horizontal position of the top left corner of the output It is ignored by type 0 output
Y is the vertical position of the output

EXITCHK

This checks whether an exit exists if there is not an exit location 900 will contain a zero If the exit does exist it will contain 255 Its syntax is

SYS 36867,LOCNO DIRECTION

LOCNO is as before
DIRECTION specifies the direction you want to move

0 North
1 North-east
2 East
3 South-east
4 South
5 South-west
6 West
7 North-west
8 Up
9 Down

An example of its use would be

```
1000 SYS 36867,LN DI
1010 IF PEEK(900)=0 THEN PRINT
 YOU CAN'T GO THAT WAY"
```

CHANGE

This allows you to create or remove an exit during the game Its syntax is

SYS 36870,LOCNO,DIRECTION ACTION

LOCNO and DIRECTION are as before
ACTION specifies what will happen A value of 0 closes the exit and a value of 1 creates an exit An example of its use is

```
2000 SYS 36870 3,2,1 PRINT "A
ROCKFALL SEALS THE
PASSAGE TEST"
```

CHKDEST

This command checks the destination reached if you were to move in a specified direction The number of the destination is held in location 901 The syntax of the command is

SYS 36873,LOCNO DIRECTION

The routine does not check whether an exit exists you must do that The following code fragment assumes that your current location is in LO and attempts to MOVE you in direction DI

```
100 SYS 36867,LN,DI
110 IF PEEK(900)=255THEN
PRINT 'YOU CAN'T GO THAT
WAY RETURN
RETURN
120 SYS 36873 LO,DI LO=PEEK
(901) RETURN
```

The code is provided as a normal BASIC loader but you will no doubt wish to save it as object code For those of you with machine code monitors save the block from $9000 to $92D2 The editor includes a small saving routine which can be used for the job What you do is

1) RUN the editor and select the SAVE option
2) When prompted for the file name, break out of the editor with RUN STOP/RESTORE
3) Give the command

SYS 870 filename,8,2,36864 37586
if you are a disk user or

SYS 870 filename 1 2 36864 37586

for cassette

The resulting code can be loaded directly by

LOAD filename,8,1 or LOAD filename 1 1

The editor is menu driven and therefore self-explanatory A few points should, however, be made

The initialise tables option fills the data tables with zero bytes Since the destination table is of variable size you must specify the highest location to be used This value is used to decide how much memory must be saved later The program does not save the number of locations You must remember it since you will be prompted for its value when you use the LOAD option

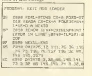
The display location option lists the destination and exit entries for the specified location The set up option allows you to specify the exits and destinations You should set up the exits first The destination portion will then ask you to specify the destination for each available exit

If you plan to create an exit during the game, use the editor to create the exit and the destination and then use the editor to close the exit The destination entry will be retained for when you need it

The thing to remember is that you should plan everything on paper before using the editor Changing databases once you've started work may not always be possible The final code fragment pulls three of the commands together in a simple routine for moving about

```
10 DATA N NE,E SE S,SW,W NW,
W U D
20 FOR I=0TO9.READDI$(I) NEXT
30 LO=1
40 PRINT CHR$(147) PRINT
'LOCATION"LO
50 SYS 36864 LO 0 0 5
60 INPUT"WHICH WAY',DI$ I=0
70 IFDI$=DI$(I) THEN 100
80 I=I+1 IFI<10THEN70
90 GOTO60
100 SYS 36867 LO,I IFPEEK(900)=0
THEN PRINT 'YOU CAN T GO
THAT WAY' GOTO60
100 SYS36873 LO,I LO=PEEK(901)
GOTO 40
```

That's all for now, next time I will look at text storage



```
PROGRAM: EXIT MOD LOADER

38  2000 FORL=0TO45 CX=0 FORD=0T
    015 READA CX=CX+A POKE36864+
    L*16+D A NEXTD
02  2010 READA IFA<>CXTHENPRINT "
    ERROR IN LINE";2040+(L*10):S
    TOP
0F  2020 NEXTL:END
D5  2040 DATA76,12 144,76 36 146
     76 73 146 76 157 146 32 86,
    145 141,1574
EC  2050 DATA72 3,32 86 145 141,
    73 3 32 86 145 141 74 3 32,8
    6,1154
3F  2060 DATA145 141 75 3,169 0,
    141,132 3 173 73,3,240,102,3
    2 20 1452
0A  2070 DATA146 160,110 160 145
     32 30 171,172 72 3 185 0,14
    7 141 76,1787
45  2080 DATA3 201,255 208 21 10
    5 0 140,201,3,208 14 230 75
    3 32 1795
56  2090 DATA20 146 169 145 160
    145 32 30 171 56 162 0 70 76
    ,3 142,1575
5D  2100 DATA77,3,144 3 32 14,14
    5 232 224 0 208,240 174 72 3
     185 1760
D8  2110 DATA0 140 141,76 3 162,
    0 70 76,3 142,77 3 144,3,32,
    1786
1C  2120 DATA14 145 232 224,10,2
    08 240 173 132 3 208 7 169,2
    49 160,145 2319
FC  2130 DATA32 30 171 56,160 0
    141,74 3 32 20 146,169 100,1
    62 145 1486
0C  2140 DATA32 30 171 238 75,3,
    32 20 146 172 72,3,185 0 147
    ,141 1487
65  2150 DATA76 3 201 255 208 15
     185,0,148 201 3 208 0 165 1
    26 160 1066
91  2160 DATA145 32 30 171 56,16
    2 0,70,76 3 142 77 3 144 3 3
    2,1194
40  2170 DATA40 145 232 224 0 20
    8,240 174 72 3 185 0 148,141
    ,76 3 1903
0E  2180 DATA162 8,70 76,3 140 7
    7 3 144 3,32,40,145,232 224
    10 1375
BC  2190 DATA208 240 165 157 32
    210 255,169 32 32,210 255 16
    9 13 32 210 2393
03  2200 DATA255 173 132,3,209 7
     169 249 160 145 32 30 171 5
    6 230,75 2143
12  2210 DATA3 32 20 146 174,77,
    3 185 165,145 160 189 155 14
    5,32,30 1673
37  2220 DATA171 174 77 3 238 13
    2 3 96 32 31 146 152 174 77,
    3 24 1533
7F  2230 DATA125 2 146 201 40 14
    4 6 230 75 3 32,20 146 174 7
    7 3 1432
34  2240 DATA185 166 145 100 185
     155 145,32,30 171 169 44 32
     210,255,174 2273
5A  2250 DATA77,3 238 132 3,96,3
    2 253,174 32,138 173,32,247,
    183 165,1978
C1  2260 DATA20 164,21 96 84 72
    69 82 69 32,65,82 69,32,69,8
    0 1114
91  2270 DATA73 64 83 58,13 0 65
     88 73 84,83 58 13 0,73,76 5
    30
24  2280 DATA32 65,76,76,32,69,7
    3,82 69 67,84,73,79 78 83,13
     1050
ED  2290 DATA0 65,76,76,32,87 65
     69,83 13,0 175 181 192,197
    200 1535
6E  2300 DATA214 225,230 241,244
     145,145 145 145 145 145 145
     145 145 145 78 2662
57  2310 DATA79 82 84 72 0 78 79
    ,82,84,72 45 69,65 83 84 0 1
    058
EA  2320 DATA69 65,83 84 0 83 79
     85 84 72,45 69 65 83 84 0 1
    058
85  2330 DATA83 79 85,84 72 0,83
     79 85 84 72,45 87 69 83,84,
    1174
02  2340 DATA0 87 69 83,84 0 78
    79,82 84 72 45,87,69,83 84 1
    006
A3  2350 DATA0 85 80 0,68 79 87,
    78 0 70 79 87 72,69 82,69 10
    13
5C  2360 DATA0 13 5,10,4 10,5,10
    ,4 10 2 4 1 2 4,0,52
66  2370 DATA16 32 64,128 174 75
    ,3 172 74 3,24,32 240,255 96
     56 1444
46  2380 DATA32,240,255 96 32 86
     145 141 72 3 32 86 145 172,
    72 3 1612
63  2390 DATA170 201 0,176,18 18
    5 0,147,81 12,146 201 0,240
    2,169,1734
DE  2400 DATA255,141 132 3 96,56
     233 0,170,185,0 148,76 56 1
    46 32 1737
D7  2410 DATA86,145 141,72,3,32
    86 145,141,78 3 32 86 145 14
    1,75 1415
E6  2420 DATA3 172,72 3 173 78 3
    ,201 0,176 11 170 185 0 147
    32 1434
A1  2430 DATA132 146,153 0 147 9
    6 56 233 0,170,185,0,140,32,
    132 146 1704
51  2440 DATA153 0 140 96 141,76
    ,3,173,79,3,240 7 173 78 3,2
    9,1400
5A  2450 DATA12 146 96,160 255 5
    6 253 12 146 45 76,3,96,32 0
    6 145 1620
A1  2460 DATA141 72 3 32 86 145,
    141 78 3 172 72 3 160 0 133
    251 1501
65  2470 DATA169,149,133,252 192
     0 240 16 24,165 251 105,10,
    133,251 165,2265
24  2480 DATA252 105 0 133 252,1
    36,208,240,172 78,3 177,251,
    141,133 3 2204
3C  2490 DATA96 0 0 0 0 0,0,0,0,
    0 0 0,0,0 0 0,96
```

PROGRAM EXIT MOD EDITOR

```
0B  1 REM*******************
C8  2 REM* ADVENTURE KIT *
A3  3 REM*  EXIT EDITOR  *
15  4 REM*******************
95  10 IFA=1THENA=2 LOADFI0 DE 1

A5  20 IFA=2THEN 60
AE  30 POKE55 9*16 CLR
1E  40 POKE53280 0 POKE53281 0 5
    A=9*4096 C1=1274
6A  50 DL$="[SPC39]
75  55 DI$(0)= NORTH" DI$(1)= NO
    RTHEAST  DI$(2)="EAST" DI$(3
    )= SOUTHEAST"
50  56 DI$(4)="SOUTH' DI$(5)= SO
    UTHWEST" DI$(6)="WEST" DI$(7
    )="NORTHWEST
31  57 DI$(8)="UP" DI$(9)= DOWN"
60  60 PRINT"[CLR] TAB(13)"[C8]A
    DVENTURE KIT
07  70 PRINTTAB(13)"[SD]3]
30  80 PRINT"[DOWN] TAB(14) [YEL
    LOW,RVSON]EXIT EDITOR[RVSOFF
    ]
C0  90 PRINT [DOWN2] TAB(10) [WH
    ITE]1 INITIALISE TABLES
33  100 PRINTTAB(10)"2 SET UP A
    LOCATION
69  110 PRINTTAB(10)"3 DISPLAY A
     LOCATION
4E  120 PRINTTAB(10) 4 SAVE TABL
    ES"
DA  130 PRINTTAB(10) 5 LOAD TABL
    ES"
2E  140 PRINT"[DOWN2] TAB(14) [C
    8]SELECT OPTION
ED  150 GETI$ IFI$< 0 ORI$> 5 TH
    EN150
DA  160 I=VAL(I$)
48  170 ON I GOTO 175 1000 450,5
    30,630
2E  175 PRINT '[CLR]WHAT IS THE
    HIGHEST LOCATION NUMBER
6F  176 INPUT TO BE USED" LL
2C  180 PRINT"[CLR]INITIALISING

08  190 FOR I=37632 TO 38143  PO
    KE I,0 NEXT
CA  195 FORI=0TO(LL*10)+10 POKE3
    8144+I,0 NEXT GOTO30
1A  200 INPUT [CLR]LOCATION NUMB
    ER",LO
BE  210 B1 PEEK(37632+LO) B2=PEE
    K(37888+LO)
F5  220 PRINT [CLR]LOCATION  LO
0D  230 PRINT [DOWN2] TAB(5) [SP
    C3]N[SPC3]S[SPC3]E[SPC3]N U
    D"
CF  240 PRINTTAB(5)  N E E E S W
     W W P N
48  250 PRINTTAB(5)"[CA,S* CR S*
     CR,S* CR S* CR S* CR,S*,CR
    S*,CR S* CR,S* CR S* CS]
EE  260 PRINTTAB(5) [S ] [S ] [S
    -] [S ] [S-] [S-] [S ] [S-]
    [S-] [S-] [S-]
0C  270 PRINTTAB(5) [CZ S*,CE,S*
     CE,S*,CE,S*,CE,S* CE S* CE
    S* CE S* CE,S*,CE S*,CX]
48  280 FORI=0TO9 POKEL1+54272+I
    *2 1 NEXT
48  290 PRINT [DOWN9,WHITE YELLO
    W,RVSON]S[RVSOFF] SET EXIT
    [RVSON]C[RVSOFF] REMOVE EXIT
      [RVSON]-[RVSOFF] TO EXIT
0B  300 PRINT"LEFT AND RIGH CURS
    OR KEYS TO MOVE CURSOR
19  310 PRINT [RVSON] [RVSOFF] E
    DIT ANOTHER LOCATION[C8]
65  320 GOSUB670
A5  330 SYS5A,LO,0,0 10
1E  340 PL=C1
C1  350 GETI$ IFI$<> THEN380
1D  360 LC=PEEK(PL) POKEPL PEEK(
    PL)OR128 FORD=1TO100 NEXT
AF  370 POKEPL CC FORD=1TO100 NE
    XT GOTO350
F2  380 IF I$="[RIGHT]'ANDPL<L1+
    18 THEN PL=PL+2 GOTO350
30  390 IF I$="[LEFT] ANDPL>L1 T
    HEN PL=PL 2 GOTO350
AF  400 IFI$= C THENPOKEPL 87 GO
    SUB740 GOTO360
FD  410 IF I$= -"THEN60
A9  420 IFI$= S THENPOKEPL 81 GO
    SUB740 GOTO360
DD  430 IFI$="" THEN1000
B5  440 GOTO350
4A  450 INPUT [CLR]INPUT LOCATIO
    N ,LO
E0  451 PRINT [YELLOW]DIRECTIONE
    SPC7]DESTINATION[DOWN]
2A  452 FORI=0TO9 PRINTDI$(I) NE
    XT
```

```
D6   457 PRINT [HOME,DOWN2]  FORI
     =0TO5 SYSSA+9 LO I PRINTTAB(
     18)PEEK(98I) NEXT
DE   460 PRINT [WHITE]   SYS SA L
     0 2 0 15
DD   470 PRINT PRINT [DOWN2] TAB(
     8)"[C7 RVSON] [RVSOFF] DISPL
     AY ANOTHER LOCATION"
1G   480 PRINTTAB(12)"[RVSON]←[RV
     SOFF] EXIT TO MAIN MENU[C8]

1F   490 GET I$ IFI$=""THEN 490
2F   500 IFI$=""THEN450
D7   510 IFI$="←"THEN60
3E   520 GOTO490
A1   530 RESTORE  FOR I=870 TO 92
     4  READ X  POKEI X  T=T+X NE
     XT
3F   540 IF T<>5940 THEN PRINT"DA
     TA ERROR"  END
B5   550 PRINT"[CLR]PLEASE NOTE L
     AST LOCATION USED IS",LL
40   555 INPUT "INPUT FILE NAME",
     FI$
ED   560 INPUT [DOWN]DEVICE (8=DI
     SK  1=CASSETTE)  DE
1B   570 PRINT [DOWN3]SAVING TABL
     ES         "
D6   580 SYS 870 FI$,DE,2 37632,3
     8154+LL*10
FF   590 GOTO 60
55   600 DATA 32 212 225 32 253 1
     74 32 138 173 32,247 183 166
      28 72 165 21 72,32 253
```

```
CA   610 DATA 174,32,138 173 32 2
     47 183 165 1 41 254 133,1,16
     6 20 164,21,164,133 21
C1   620 DATA 164 133 20,165 22 3
     2 85 225 165 1 9 1,133,1,96
51   630 INPUT "[CLR]LAST LOCATIO
     N USED",LL
55   635 INPUT "INPUT FILE NAME"
     FI$
7D   640 INPUT [DOWN]DEVICE (8=DI
     SK   1=CASSETTE)";DE
F3   650 PRINT"[DOWN3]LOADING TAB
     LES         "
9C   660 A=1 GOTO10
3E   670 FOR I=0TO3 SYS36867 LO,1

6B   680 P=87 IF PEEK(980)=255
       THEN P=81
17   690 POKEL1+I*2 P NEXT
52   730 RETURN
5B   740 PRINT [HOME DOWN10]  PRI
     NTBL$ PRINTBL$
AC   750 B1=0 FORI=0TO7
AD   760 PV=PEEK(L1+I*2)
D6   770 B1=B1+ABS(PV=81)*2 I
0D   780 NEXT
34   790 B2=0 FORI=0TO3
A3   800 PV=PEEK(L1+16+I*2)
EC   810 B2=B2+ABS(PV=81)*2^I
B5   820 NEXT
DF   830 POKE(37632+LO) B1 POKE(3
     7888+LO) B2
A5   840 SYSSA LO 0 0,10
0B   850 RETURN
```

```
3E   1000 PRINT [CLR DOWN5]
53   1010 PRINTTAB(10) [WHITE]1
     SET UP EXITS
A3   1020 PRINTTAB(10)"2  SET UP
     DESTINATIONS
A3   1030 GETI$:IFI$<"1"ORI$>"2"T
     HEN1030
A4   1040 IFI$="1"THEN200
0C   1050 INPUT"[CLR]LOCATION NUM
     BER  LO
78   1060 PRINT [DOWN2 WHITE]"
A8   1070 SYSSA,LO,0,0,2
E0   1080 B1=PEEK(37632+LO) B2=PE
     EK(37888+LO)
A3   1090 FORI=0TO7 A(I)=ABS(B1 A
     ND 2 I) NEXT
22   1100 FORI=8TO9 A(I)=ABS(B2 A
     ND 2 (I-8)) NEXT
14   1110 FORI=0TO5 IFA(I)=0THEND
     (I)=0 GOTO1135
E5   1120 PRINTDI$(I)  PRINT" DES
     TINATION (NOW IS" PEEK(38144
     +LO*10+I)
18   1130 INPUT")",D(I)
F1   1135 NEXT
13   1140 FORI=0TO5:POKE 38144+LO
     *10+I,D(I) NEXT
04   1150 PRINT [DOWN YELLOW RVSO
     N]←[RVSOFF] TO EXIT[SPC3 RVS
     ON] [RVSOFF] ANOTHER LOCATIO
     N"
08   1160 GETI$ IFI$=""THEN30
8C   1170 IFI$=" "THEN1000
91   1180 GOTO1160
```

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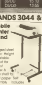

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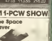

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I.Q.

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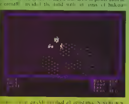
ULTIMA I

Anyone who has ever played the excellent Ultima III or even bigger and better Ultima IV will have wondered how it all started. Playing these games is like watching a film that's already halfway through. But now you can find out how it all began in this re-released version of the prequel, Ultima I.

There was once a land called Sosaria that prospered under the rule of Lord British. Unfortunately there was also an evil Wizard called Mondain who grew in power until he eventually invaded the land with an army of hideous [illegible] that quickly crushed all resistance. Sosaria now desperately needs a hero to challenge the Wizard and free the land.



If you haven't already guessed, you're the hero and you have to complete the quest on your own. As the game begins you must define your character by assigning an extra 30 points to the existing values (ten) that decide your strength, agility, stamina, charisma, wisdom and intelligence before choosing whether to be a human, elf, dwarf or bobbit and if you're a fighter, thief, wizard or cleric. Once you've decided who and what you are you head for the great outdoors and a familiar Ultima wilderness screen littered with towns, castles and dungeons. Enter one of these and the screen will change to show the rooms of the building.

Inside towns and castles you can buy food and drink to keep you alive, a room to sleep off injury and exhaustion and shops to buy equipment and weapons to prolong your quest.

As in the subsequent Ultima games you move around, fight and cast spells by pressing single key commands that are detailed on a quick reference guide. This is supplied in the display game box with the disk, booklet of spells and monsters, colour maps of the realm and a small bag of coins.

Ultima I has been rewritten and speeded up for this relaunch and is a must for Ultima adventurers. You may find it a little easy after III and IV but it's still a challenging quest that will lead you to the stars (I'm not saying any more, you'll have to find out the rest yourself). Coming soon Ultima II and then V!

I H

Touchline

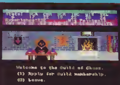
Title *Ultima I* ***Supplier*** *Origin (Microprose) 2 Market Place, Tetbury, Gloucestershire GL8 8DA* ***Tel*** *0666 54326* ***Machine*** *C64* ***Price*** *£19.95 (disk only)* ***Originality*** *7/10* ***Playability*** *7/10* ***Graphics*** *4/10* ***Value*** *7/10* ***Graphics*** *4/10* ***Value*** *7/10*

ALTERNATIVE REALITY

Imagine all your worst nightmares joined together and there is a fair chance that most of them will materialise in the Dungeon. Hidden somewhere beneath the City of Xebec's Demise you find yourself in the middle of a bitter conflict with evil proliferating around you. Can you survive long enough to discover how you can turn this discord to your advantage?

The Dungeon is the second scenario in Datasoft's Alternate Reality series. It follows on from the City but you do not need to own this game in order to play. The story is that you have been kidnapped by an alien spacecraft. You find yourself in a room with only one exit which leads into an alternate reality.

As you leave the room a panel of quickly rotating numbers freeze and your character statistics are generated



Welcome to the Guild of Chaos.
(1) Apply for Guild membership.
(0) Leave.

There [illegible] intelligence [illegible] skill [illegible] hit points. A high figure for hit points [illegible] the [illegible] is [illegible]. You will [illegible] other [illegible] more [illegible] your [illegible] would seem [illegible].

[illegible] should [illegible] as [illegible] and clothes [illegible] too [illegible]. A club [illegible].

As [illegible] will [illegible] something. [illegible] who [illegible] run away [illegible] choices [illegible] offer [illegible] fight [illegible] normal [illegible].

The [illegible] thieves [illegible] the undead [illegible] friend [illegible] enemy [illegible].

Do [illegible] some [illegible] enchantment [illegible] them [illegible]. There are hundreds [illegible] keep walking [illegible]. Or you could [illegible].

Magic [illegible] you can find [illegible] spell casting [illegible] gleaned from vanquish[illegible] opponent [illegible] contains magical items. Potions, wands, tomes, scrolls, trump cards, magic eyes and horns all feature prominently.

Of course not all treasure is good treasure. Quite a bit of it is cursed, and in which case you will need to repair your guild in order to have the curse removed. Other occupational hazards include catching diseases, being poisoned, getting hungry, thirsty or tired or suffering from extremes of temperature.

Although survival is your initial aim, as you progress you find that there are various quests that you can [illegible]. A prisoner wants rescuing, a golden apple needs [illegible] and you need to find two halves of a ring, forge them together and then destroy the ring in the fires of the [illegible].

The dungeon is displayed in 3-D with large illustrations representing special areas such as shops, guilds, the oracle and [illegible]. In size the Dungeon is a third bigger than the [illegible]. Spread over four levels, level one is on a 64x64 grid with successive levels each being a quarter of the size of the one [illegible]. This means that accurate mapping is essential. A [illegible] is included and it is suggested that you [illegible]. Certainly you will make many mistakes. I found [illegible] that I just could not match up and it was [illegible] only one square out either. Teleports, one way [illegible] only add to your problems.

The game is [illegible] playable, although expect to kill off [illegible] characters until you get your bearings. One of the complaints levelled against the [illegible] was that disk [illegible] was very poor and this is something that has [illegible]. My one grumble is that the save [illegible] clumsy. After saving it would be nice to be able to [illegible] straight away rather than having to reload the character [illegible].

[illegible] has only touched on a few of the [illegible]. The Dungeon [illegible] atmosphere and is [illegible] one of the best role-playing games on the [illegible]. [illegible] in the series are [illegible] this type of game have a [illegible].

G.R.H.

Touchline

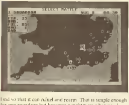
Title [illegible]
Supplier [illegible] Way, Holford, Birmingham [illegible]. Tel [illegible]
Machine C64 [illegible] ***Price*** [illegible]
Originality 9/10 ***Graphics*** [illegible]/10 ***Playability*** 10/10
Value 9/10

CONFLICTS 1

There's a treat in store for wargame fans with the release of three of PSS's best known games on one compilation tape. The games are about as different in subject matter as it is possible to get – an air battle, an assault on an island and the defence of an entire continent.

Battle of Britain takes you back to 1940 as you try to pit the limited resources of the RAF against the might of the Hitler's Luftwaffe. The game can be played on three levels ranging from a training game to a fully blown thirty day campaign.

The display is a map of southern England and you are responsible for scrambling squadrons of Spitfires and Hurricanes to counteract the threats of the German fighters and bombers. Not every squadron is available to you as weather conditions play an important part of the game – airfields may be fogbound. The problem is to get a squadron into the air, put it on a course where you think it will intercept the enemy and then after it has attacked, direct it to



land so that it can refuel and rearm. That is simple enough for one squadron but becomes a nightmare when you have eighteen to control all in real time. There is an optional arcade sequence in which you sit in a Spitfire cockpit trying to shoot marauding Messerschmidts.

Theatre Europe was the game that brought fame and notoriety to PSS. Set in the near future it simulates an attack by the Eastern block against the combined forces of Nato. The controversy was caused by the fact that you have a nuclear strike capability, either limited or full scale. There were howls of protest from the anti-nuclear brigade and the people who thought that all wargames encouraged bellicosity and ought to be banned. As is usual in these cases everyone missed the point entirely.

Whichever side you play, it soon becomes apparent that using the nuclear option is a losing one in so much that both sides escalate everything it becomes goodbye world as we know it. That said, there is still enough in this game to keep you thinking. You must keep your troops supplied use your airborne forces to their best advantage and decide whether to use chemical weapons. All this on top of fighting a ground battle on a massive scale. There are seven different air missions that you can fly ranging from reconnaissance to attacking enemy supply units.

Falklands 82 has five different levels of play. You must decide where on the island you are going to land your forces and then you only have a limited amount of time in which to clear the island of Argentinian forces. Wise use of your SAS and SBS forces for reconnoitring purposes should help you here.

Each unit has attack and defence factors a movement allowance and attacking range. For example a battery cannot move very far each turn but can attack from long range whereas the Paras have to be next to their opponents before committing themselves to battle. After an attack you may well depending on conditions be able to summon up an airstrike or request naval gunfire to help you. Time is limited especially on the harder levels and the task of liberating all the settlements is no easy one especially as you don't know the disposal of the enemy forces.

All three games are very well presented and easy to control being by and large menu driven. Whereas they lack the complexity of some fully blown wargames they more than make up for it by being very easy to get into and retaining a high degree of playability. As such they are highly recommended to beginners and newcomers of this fascinating art.

G R H.

Touchline
***Title** Conflicts **Supplier** PSS **Tel** 0203 667556 **Machine** C64 **Price** £12.95 (ca) £17.95 (d)*
***Originality** 8/10 **Playability** 8/10 **Graphics** 7/10 **Value** 8/10*

STATIONFALL

Your career still hasn't developed the way that you envisaged when you joined the Stellar Patrol some five years ago. You started off as Ensign seventh class sweeping the decks of space ships. Then by some quirk of fate and more than a little skill on your part you manage to save a planet. Promotion came fast. You are now a lieutenant first-class but still the excitement promised in the glossy brochures when you joined the patrol is nowhere to be found.

Look at your present assignment. Hop over to some remote space station and pick up a supply of Request for Stellar Patrol Issue Regulation Black Form Binders Request Forms. Hardly the stuff of which legends are made, is it? Your eyes light up a bit when you go to pick up your robot, as one of your three available choices is Floyd who assisted you so ably when you rescued Resida (as detailed in Planetfall). He is delighted to see you again and begs to be picked. How could you refuse such an offer?

Completing the paperwork as quickly as possible (in triplicate of course) you set the autopilot in your spacetruck and sit back until you arrive at the space station. You are a trifle surprised to find that there is no-one there to greet you. As you explore you quickly discover that the entire station is deserted. Even Plato, another robot that Floyd makes friends with is surprised to see you but isn't too sure why.

Wandering around the station the only clue that you find is in a tape of the Captain's log which has entries about the arrival of a strange alien spaceship which seemed to coincide with a progressive series of malfunctions in every piece of technical equipment. Your worst fears are confirmed when you are attacked by a homicidal hull repair droid.

As is usual with Infocom games the story is lovingly crafted. It is impossible not to fall for Floyd nuisance that he is as he creeps up noisily behind you to shout 'boo' lovingly in your ear. The descriptions of locations and objects are wonderful and no-one has mastered the art of guessing the players 'incorrect inputs' and answering them back in a similar vein – quite like Infocom.

Their parser though, once the wonder of adventurers everywhere is beginning to look somewhat frayed round the edges especially when compared to the likes of Magnetic Scrolls. For example a phrase like 'get the tape and examine it' won't work as the parser assumes that you are trying to get something called an 'examine'.

I can't see any adventurer being disappointed, especially if they enjoyed Planetfall. The packaging which includes a sew-on patch a set of blue prints and your mission's instruction dockets, just helps to create the atmosphere of yet another excellent Infocom adventure.

G R H

Touchline
***Title** Stationfall **Supplier** Infocom (Activision) **Tel** 01-431 1101 **Machine** C64 –disk only **Price** £24.99*
***Originality** 8/10*
***Graphics** N/A **Playability** 9/10 **Value** 8/10*

Making Music

The second installment of our music series continues coverage of the 64's sound chip, SID, and explains how to play tunes on your Commodore.

By Peter Gerrard

You will find in your Commodore 64 manual a list of high and low value frequencies for a number of notes They're on page 161 if you've lost them! Here we are concerned with locations (V+0) and (V+1), which will contain the low and high order value frequency respectively

Say we want to play the note C-3 A glance at the table reveals that the high value frequency is an 8, and the low value frequency is a 97 So, in order to play that note the final line of our program becomes

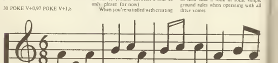
```
30 POKE V+0,97 POKE V+1,8
```

Obviously the V+0 could be abbreviated to just V if you wanted To play any other note just alter the low and high value frequencies in line 30 (values between 0 and 255) To alter the waveform alter the number in line 25 (remembering to alter the pulse width as well if you select a pulse waveform) choosing between 17 33 65 and 129 To alter the ADSR settings fiddle with the values in line 20 (values between 0 and 255), and to alter the volume just change the value in line 15 (values between 0 and 15 only please for now)

When you're satisfied with creating a few simple noises or notes, we'll travel onwards and take a look at producing some harmonies using all three voices

In Harmony

Producing notes with all three voices is not that much more difficult than producing notes with one Having gone through the effort in the last section of setting up a simple note let us now take a look at some simple ground rules when operating with all three voices



Volume

This unfortunately has to be the same for all three voices and if the control register is set at 15 then all three will be pumping out their notes at maximum volume However by using different waveforms and playing notes from different octaves one can create the effect of different volumes for the different voices A low note played using a triangle waveform will sound much quieter than a high note played using a sawtooth waveform for example

ADSR

These can be different for the three voices and it is usually a good idea to make use of this fact when playing notes in harmony Harmonic effects are probably heard to their best effect when notes are sustained for a reasonable length of time rather as one would expect on an organ and so in our program to follow we'll be doing precisely that. Attack and decay rates however are probably best left up to the requirements of the individual voices

Remembering that musical notation refers to notes as C D E F G A B and then back to C again, one octave further up of course!

To produce a simple chord of C then we'll take the following high and low value frequencies

Note	Low Value	High Value	Frequency
C	24	2	536
E	163	2	675
G	35	3	803

From that you can probably work out the relationship between frequency and high and low values Multiply the high value by 256 (now *there's* an unfamiliar number!) and add the result to the low value This gives us the frequency value So why are frequency values easier to work with? Well if we wanted to play our chord in a higher octave say the next octave up the scale we would multiply the frequencies by 2 this is the relationship between notes in different octaves To go up another octave then we'd multiply the frequency by 2 again It's a lot easier multiplying one number by 2 than it is multiplying two numbers and trying to extrapolate a result from that!

So, having got the values let's take a look at our program bearing in mind that we're going to be using all three voices and that the control registers that look after each voice come in blocks of seven That is if we use our variable V=54272 we'll see that the waveform for voice one is controlled by register (V+4) for voice two by (V+4+7 or V+11)

Waveforms

Once more we can make use of the facilities available with the SID chip and use different waveforms for each of the voices However the white noise waveform is not going to be an awful lot of use if we're going to be attempting to produce intricate, pleasant sounding harmonies so for the purpose of this exercise we'll stick to just triangle sawtooth or pulse

Note Values

Fortunately all of these are worked out for you in the Commodore 64 manual and as well as giving you the high value and low value frequencies for each note over some seven octaves they also give you the value of the note in cycles per second This is related to the frequency values in quite a simple fashion but it can be of more use to us especially when lengthy tunes or more advanced programming methods are encountered

When playing in harmony it is probably best to stick to some straightforward rules One doesn't have to be a Mozart to realise that C and C Sharp when played in conjunction with D are not going to sound very harmonious Consequently, in these early experiments we'll stick with playing some very simple chords Simple but they do produce a very pleasing result We'll start with a very straightforward chord played in the key of C and using the notes of C, E and G for our three voices and for voice three by (V+4+7+7 or V+18) This enables us to set up a simple FOR NEXT loop to look after all three voices

The Program

As before we'll flush out the entire SID chip contents first before we start by setting the variable V and turning the volume on

```
5 FOR I=0 TO 24:POKE 54272+I,0:
NEXT
10 V=54272
15 POKE V+24,15
```

So far so good and exactly the same as before Now let's set the ADSR sequences up for the three voices

```
20 POKE V+5,9:POKE V+6,240
21 POKE V+12,9:POKE V+13,240
22 POKE V+19,33:POKE V+20,36
```

There is no great significance to any of those values other than that we have used quite a long sustain and release for each one Now to set the waveforms

```
25 FOR I=0 TO 2:POKE V+I*7+
0:NEXT I
26 POKE V+4,17:POKE V+11,
33:POKE V+18,65
27 POKE V+16,0:POKE V+17,255
```

The only difference now is that we're using different waveforms for all three, and that voice three is using the pulse waveform Finally we need to play the actual notes, like this

```
30 POKE V+0,24:POKE V+1,2
31 POKE V+7,163:POKE V+8,2
32 POKE V+14,35:POKE V+15,3
```

The result is hopefully a pleasant sounding chord

From here it is but a simple matter to play different chords in different keys All you'll need to do is to look up the high and low values frequencies in the manual and remember that chords tend to go in jumps of two notes at a time That is something like C, E, G as we've played here or D F A for a chord of D, or G B D for a chord in G and so on You are welcome of course to experiment with discordant chords, if you can have such a thing but remember that you might get on very well with your neighbours at the moment and that I won't be responsible for any untoward results

Bearing in mind the techniques used here (and in particular the use of a FOR NEXT loop and the relationship between the three voices) it is but a simple step to go from notes and chords to proper tunes There are many ways of extracting a tune from your Commodore 64 and in the next installment we'll take a look at some of the easiest methods

Playing Tunes

Using the material that we ve covered so far there is really only one thing further that you need to know in order to be able to play some tunes on your Commodore 64 — the notes we re going to play

Later on we'll be using a modified synthesiser program to do all this for us, but for now we'll stick to some very simple things that most people will either know before typing in or recognise when played Having got as far as using three voices we will continue to use them, and we may as well stick to the waveforms and ADSR envelope shapes that we ve already set up So our program begins like this

```
5 FOR I=0 TO 24 POKE 54272+I 0
NEXT
10 V=54272
15 POKE V+24 15
20 POKE V+5 9 POKE V+6 240
21 POKE V+12 9 POKE V+13,240
22 POKE V+19 33 POKE V+20 36
25 FOR I=0 TO 2 POKE V+I*7+4 0
 NEXT I
26  POKE  V+4 17 POKE  V+11  33
POKE V+18 65
27POKE V+16 0  POKE V+17,255
```

So far so good and so far familiar We won t yet carry on to include the three lines from the last section that actually played a chord, we'll consider what notes we are going to play first of all

A familiar enough tune to everybody must be the 'theme' used in Close Encounters of the Third Kind when the aliens and humans finally establish some sort of communication and produce a welter of sound and lighting effects that would do justice to an Electric Light Orchestra concert The five all-important notes are D E C from one octave and from an octave further down we have C and G The five notes are played in that order and since they also have more or less the same duration, we can concentrate on the notes for now and worry about the duration afterwards

It really is about time to forget about high value and low value frequencies and to turn permanently to true frequency values or the number of cycles per second for each particular note For the five notes in our Close Encounters theme, the frequency values are as follows

```
100 DATA 1204 1351  1432, 536,
803
101 DATA -1
```

The -1 data element in line 101 will serve to tell the program that we've run out of data and are not going to be playing any more notes If we add the following lines to our main program, we'll be able to produce a simple tune

```
30 READ F IF F=-1 THEN FOR
I=0 TO 24 POKE V+I 0 NEXT
I END
31 FH=INT(F/256) FL=F-FH*256
32 FOR I=0 TO 2
33 POKE V+I*7 FL POKE
V+I*7+1 FH
34 NEXT I
40 GOTO 25
```

This as you will soon realise does not produce a very sensible tune, and we do need to introduce some form of delay before going back to line 25 and getting the next note a line something like line 35 would suffice for now

```
35 FOR I+0 TO 1000 NEXT I
```

A one second delay occurs between notes But wouldn't it be better if we were to let the program produce the delay for us, rather than just having a one second delay all the time? Here's just one way of doing that

```
100 DATA
1204,50 1351,50 1432,50 536 50
803,100
```

and amending line 35 to read

```
35 READ DE FOR I=1 TO
DE*20 NEXT I
```

This gives us much more control over the duration of each of the notes but is still a long way from being really satisfactory We can only achieve this through much trial and error, or removing the programming side of things altogether and letting the person running the program do the job If we had our original line 100 back again which is

```
100 DATA 1204,1351 1432, 536  803
```

we could insert yet another new line 35 to read

```
35 GET A$ IF A$ < >" " THEN
35
```

In which case we would wait for the person running the program to press the space bar before proceeding on to play the next note However this is still using alot of the 64's musical capabilities and in order to make each voice play the note in a different key we would have to make something like this

```
31 FH=INT(F/256) FL=F-FH*256
32 FOR I=0 TO 2
33 POKE V+I*7,FL POKE
V+I*7+1 FH
34 NEXT I
```

into

```
31 FOR I=0 TO
2 F=F*2 t I FH=INT(F/256) FL=F
FH*256
32 REMark is now redundant
33 POKE V+I*7,FL POKE
V+I*7+1 FH
34 NEXT I
```

Each voice now plays its note in a successively higher octave the new frequency value being determined by the statement F=F*2 ↑ I in line 31 since this will give us the value F on the first pass through the loop when I is equal to zero F*2 when I is equal to one and finally F*4 when I is equal to two Raising two to the power of I is a useful shortstep to producing the desired frequency

But all this is concerned with producing simple notes albeit in different octaves How might we go about producing a three part harmony, still using our Close Encounters data and no more? For this we have to try and understand the relationship between individual notes since we do not want to spend the rest of our days working out vast numbers of different frequency values

Note to Note

We've already noticed that octaves are separated by a frequency value of two That is C in one octave has half the frequency of C in the next octave, a quarter that of C in the next octave again and so on Unfortunately for us there isn't a convenient number of notes from one C to the next since there is only a gap of six notes between Cs or seven notes (including the C itself) in total

A simple but not entirely satisfactory solution would be to divide the difference between two octaves into sevenths and use these values for our chords of D E C C again and G for the Close Encounter theme Alas (as you'll discover if you try it out) this does not work out exactly Those little black notes have a habit of getting in the way

Fortunately there is a mathematical expression for getting the frequency of the next note up the scale provided you know the frequency of the proceeding note and it works like this Assume that F is the frequency of the note not yet converted into high and low values to be POKEd into memory Then if we assign this to say C then the frequency of the note D in the same octave is found by the expression

```
FN=INT(F*2 ↑ (1/6))
```

A mite complicated but it does work! For example the frequency of a particular C in a particular octave is given as 1072 cycles per second Applying this to our formular above gives us the new frequency of 1203 Not exactly the value given in the manual (which is 1204) but close enough and those in the manual are never meant to be taken as gospel anyway

So once more unto the breach, and instead of spreading our three voices over different octaves we'll now get them playing in harmony by introducing the following changes to the program

```
31 FOR I=0 TO 2 IF I=0 THEN
FH=INT(F/256) FL=F
FH*256 GOTO33
32 F=INT(F*2 ↑ (2/(12/(I*2+1))))
33 POKE V+I*7 FL POKE
V+I*7+1.FH
34 NEXT I
```

Now doesn't that look wonderfully complicated? It's quite simple, really don't panic! On the first pass through the loop nothing untoward happens because we just want the orignal value of the frequency Second time around remembering that a chord of D will consist of the notes D F A we want to be two notes higher up In other words replace the original (1/6) by (1/3) which believe it or not is what all the rigmarole above does On the final pass through the loop we want the frequency of the note that is four notes up from our original D, but since we cannot have (1/6) replaced by (1/1 5) we have to do everything in fractions of 12

The main thing is that it works Also a few of the variations on a theme that can be achieved by using just five data times By playing in different octaves or by producing chords we begin to get some idea of the power behind the 64 But this isn't of course the only method of playing tunes on the machine and so for the rest of this particular section we'll be taking a look at one or two other examples of tune playing After that well, the light relief is over and we turn to theory in our attempts to get the most out of the SID chip

Tuning up

Here's the first of just two different methods of playing simple tunes on the 64 from data statements without any guidance at all because you should be getting familiar with the registers and their locations and functions by now Play with them embellish them, because it is only by doing that that you'll really begin to understand the workings of SID

```
10 V=54272
20 POKE V+24 15
30 POKE V+5,9
40 POKE V+6 0
50 POKE V+2,255
60 POKE V+3 20
70 POKE V+4 65
80 READ A,B C
90 IF A <1 THEN 200
100 POKE V+1 B
110 POKE V,C
120 FOR I=1 TO A*50 NEXT I
130 FOR I=0 TO 23 POKE
V+I 0 NEXT
140 GOTO 20
150 DATA
5 22 227,5,22 227,5 25,177,10,21 154
152 DATA 2 22 227 7,25 177
154 DATA
5 28 214 5 28,214 5,30,141 10,28 214
156 DATA 2 25 177 7 22 227
158 DATA
5 25 177 5 22 227 5,21 154 10,22,
227,0 0 0
200 FOR I=0 TO 24 POKE
V+I 0 NEXT END
```

One way of doing things you may (I hope) spot the 'tune being played which makes me sound like Lionel Blair I suppose but that's the only similarity between us I assure you!

For our final example here's a slightly different way of achieving the odd sound effect or two

```
10 V=54272
20 POKE V+24 15
30 POKE V+5 9 POKE
V+12 36 POKE V+19 255
40 POKE V+6,0 POKE
V+13 36 POKE V+20 70
45 POKE V+3,A POKE V+10,15
46 POKE V+2 20 POKE V+9 20
50 POKE V+4,65 POKE
V+11 129 POKE V+18 129
60 FOR I=0 TO 40 POKE
V+1 I POKE V+7 4 POKE
V+15 3 NEXT I
70 A=A+10 IF A>250 THEN A=0
80 FOR I=0 TO 23 POKE
V+I 0 NEXT I
90 GOTO 30
95 FOR I=0 TO 24 POKE
54272+I 0 NEXT
```

Press the RUN/STOP key to get out of this one and then enter GOTO 95 to shut everything up.

There are many weird and wonderful sound effects that can be achieved by 'mucking' about with just the things that we've learnt about so far. Try altering the various parameters in this and other programmes, to see what the effect might be.

When we start considering the more advanced techniques available to us on the 64 such as filtering ring modulation synchronisation not only will we be able to start producing ever more wonderful effects but we will also be on the path to producing a true synthesiser, involving the simulation of different musical instruments and much more besides. However before we can talk about musical impersonation we need to know a great deal more about how various work and in particular how different instruments produce the sound that they do.

Consequently, in the next section we'll be looking in some detail at ADSR envelopes, and how changing them can produce a wide variety of different and unusual sounds and how combined with a selection of different waveforms and one or two other parameters we can really start to realise the potential of the 64 and its SID chip.

Attack Decay Sustain Release

In order to enhance the quality of any musical performances that we might achieve by using the Commodore 64 a thorough understanding of the envelope shape of a voice, or the ADSR setting is essential. The simple definitions that we have already given for the phrases Attack Decay Sustain and Release will tell us what they mean but will not explain precisely how they operate. Consider the following program

```
10 V=54272
20 POKE V+24,15
30 POKE V+4,0 POKE V+4 33
40 POKE V+5 9 POKE V+6 0
50 POKE V+1 10 POKE V 10
```

This produces a note of a certain frequency playing using the sawtooth waveform, and having an Attack/Decay setting of nine combined with a Sustain/Release setting of zero. The note, as you will hear soon dies away to nothing. However if we alter line 40 to read

```
40 POKE V+5,33 POKE V+6,49
```

Now the note does not immediately die away and indeed sounds rather different. A more substantial program should illustrate how the various settings of ADSR can be combined to produce some very different effects. Later on, we shall be looking at the workings of the two registers that control the entire envelope shape of the note (for voice one only, they work in exactly the same way for voices two and three)

```
10 V=54272
15 FOR I=0 TO 24 POKE
V+I,0 NEXT I
20 POKE V+24,15
25 A=1 D=1 S=1 R=1 W =1
30 PRINT "[CLR]"
35 PRINT "[HOME]Attack Decay
Sustain Release W/Form "
40PRINTTAB(4)ATAB(11)DTAB
(19)STAB(25)RTAB(37)W*16(+1
45 POKE 198 0
50 GETA$ IFA$="" THEN50
55IFA$="A"THENA=A+1 IFA=17
THENA=0
60IFA$="D"THEND=D+1 IFD=17
THEND=0
65IFA$="S"THENS=S+1 IFS=17
THENS=0
70IFA$="R"THENR=R+1 IFR=17
THENR=0
75IFA$="W"THENW=W* IFW=16
THENW=1
80 POKE V+5 A*16+D POKE
V+6 S*16+R
85 POKE V+4 0 POKE
V+4,W*16+1 POKE V+2 40 POKE
V+3 40
90 POKE V+1,20 POKE V+0 20
95 GOTO 35
```

A fairly straightforward program, but it illustrates the point. After setting up the variable V the program then displays the current settings of Attack Decay Sustain and Release on the screen before waiting for the user to press a key. Pressing the 'A' key increases the attack setting, D the decay setting, S the sustain setting and R the release setting. Finally pressing W changes the waveform should you choose to do so.

The ADSR settings are POKEd into place in line 80, before line 85 takes care of the waveform (and sets a low pulse frequency and a high pulse frequency if required) before the note itself is at last played by line 90.

You might care to add to the program so that different pulse frequencies can be selected or different notes played. The changes are not too difficult and since we've taken the precaution of having our line numbers increase in steps of five there's plenty of room for additional statements to be inserted if required. These will probably be along the lines of IF A$="something or other" THEN increase some variable. Not perhaps, the most elegant way of programming but it will suffice for this simple example.

Now for a few words of explanation. You'll see that the waveforms are set to values of 1, 2, 4 or 8. By multiplying this by 16 and adding 1 we arrive at our more familiar values of 17, 33, 65 and 129.

You will note that the various ADSR settings never progress beyond 16. This is because the two control registers that look after these settings are obviously dual purpose ones and operate in this fashion

A	A	A	A	D	D	D	D
S	S	S	S	R	R	R	R
128	064	032	016	008	004	002	001
008	004	002	001	008	004	002	001

In each case, the first four bits of each byte are used to control one setting, the second four looking after the other settings. To take the Attack/Decay register for now since the Sustain/Release one works in exactly the same way we will see that the maximum value of the Decay setting is actually 15, coming from the addition of (8+4+2+1). Sixteen possible settings then, from 0 through to 15.

It might appear that the value of the Attack can vary from 0 to (128+64+32+16) or 240, covering such values as 48, 160, etc., on the way. However adding all those combinations up gives us yes, fifteen different settings or sixteen if you include zero option. How much easier it is to think of settings ranging from 0 to 15 again (rather than 0 to 240 and obscure points inbetween) and then multiply the end result by 16 to arrive at the higher value. If you check all the possibilities through you'll soon see that this much neater system works very well

It is important to understand this principle because we will be using it again when we come to some of the other multi-purpose (not just dual either!) registers in the sections on ring modulation, synchronisation and filtering

Just think in terms of bits and bytes and our earlier discussion about how a byte is made up on an 8-bit computer

Having heard what the ADSR settings do, you might be wondering how to go about converting these settings into passable impersonations of musical instruments Well, the Commodore 64 manual gives us some hints such as

Instrument Impersonation

Instrument	Waveform	Attack/Decay	Sustain/Release	Pulse Rate
Piano	Pulse	9	0	Hi+0 Lo+255
Harpsichord	Sawtooth	9	0	
Accordian	Triangle	102	0	-

Do these sound like the real thing, if you use the values in our little program given earlier? About as much as I sound like Frank Sinatra which is not alot believe me No, there is a lot more to impersonating musical instruments than just fiddling about with ADSR settings although they are obviously important

As a starting point, though they will have to suffice and although we'll be taking a few more steps in the next couple of sections try for now to think about the sound produced by the instruments mentioned above A piano for instance produces a very sharp note, which is sustained for a while, and then usually decays away quite slowly How would you go about setting up the ADSR envelope for something like that?

Well in all these cases it is alot easier to visualise something than it is to try and describe it so the following program should be of some help when it comes to thinking up suitable ADSR settings

```
PROGRAM  ADSR SETTINGS

E0  5 POKE53280,5:POKE53281,7:PR
     INT"{CLR}"CHR$(14)"[BLACK SA
     80 SS SR] [SS]ETTINGS      "
C5  6 PRINT:PRINT"[SW]HEN REQUES
     TED, ENTER THE [SA]/[SD]/[SS
     ]/[SR]
A0  7 PRINT SETTINGS FOR YOUR NO
     TE, FOLLOWED BY THE
47  8 PRINT"WAVEFORM  AND THEN T
     HE FREQUENCY OF THE
B5  9 PRINT"NOTE ITSELF!":GOTO10
     0
AC  10 POKE53272,PEEK(53272)OR8
85  12 POKE 53265,PEEK(53265)OR3
     2
30  13 GOTO16:REM YES I KNOW IT'
     S THE MOST UNSTRUCTURED PROG
     RAM IN THE WORLD!
16  14 FORI=8192TO16191:POKEI,0:
     NEXT:RETURN
61  16 PRINT"{CLR}"
FC  20 FORI=8192TO12191:POKEI,0:
     NEXT
E0  55 Y=20:X=40
62  60 R=INT(Y/8):C=INT(X/8)
A2  65 L=YAND7
83  70 B=7-(XAND7)
05  75 BYTE=8192+(R*320)+(C*8)+L

58  80 POKEBYTE,PEEK(BYTE)OR(2^B
     )
A3  81 Y=Y+1:IFY<85THEN60
25  82 Y=Y-1:X=X+1:IFX<281THEN60

5C  83 X=40:Y=84:X1=X+A*4:Y1=20:
     RATIO=64/(X1-X+1):GOSUB300
54  84 X=X1:Y=Y1:X1=X1+D*4:Y1=52:
     RATIO=-(32/(X1-X+1)):GOSUB3
     00
8A  85 X=X1:Y=Y1:X1=X1+S*4:Y1=52:
     RATIO=1:GOSUB350
8C  86 X=X1:Y=Y1:X1=X1+RE*4:Y1=8
     4:RATIO=-(32/(X1-X+1)):GOSUB
     300
8C  50 GETA$:IFA$=""THEN50
7A  52 IFA$="^"THENPOKE53265,27:
     POKE 53272,21:RETURN
20  54 GOTO50
E6  100 PRINTCHR$(14):PRINT"[SN]
     OW JUST HANG ON A WHILE"

20  101 GOSUB14
27  102 PRINT"[CLR SA]TTACK [SD]
     ECAY [SS]USTAIN [SR]ELEASE [
     SW]AVEFORM"
86  103 PRINTTAB(1)A;TAB(8)D;TAB(1
     5)S;TAB(23)RE;TAB(31)WF
94  104 PRINT:INPUT"[SA]TTACK  (
     0-15)[SPC6,LEFT6]";A:IFA<0OR
     A>15THENPRINT"[UP2]";:GOTO10
     0
41  106 INPUT"[SD]ECAY[SPC3](0-1
     5)[SPC6,LEFT6]";D:IFD<0ORD>1
     5THENPRINT"[UP]";:GOTO106
18  110 INPUT"[SS]USTAIN (0-15)[
     SPC6,LEFT6]";S:IFS<0ORS>15TH
     ENPRINT"[UP]";:GOTO110
F2  115 INPUT"[SR]ELEASE (0-15)[
     SPC6,LEFT6]";RE:IFRE<0ORRE>1
     5THENPRINT"[UP]";:GOTO115
7A  116 PRINT:PRINT"[SA]NY MORE
     CHANGES ([SY] OR [SN])?"
88  117 GETA$:IFA$="N"THEN145
5F  118 IFA$="Y"THEN120
55  119 GOTO117
C0  120 PRINT:INPUT"[SW]AVEFORM
     (1, 2, 4 OR 8)[SPC8,LEFT6]";
     WF:IFWF<1ORWF>4THENPRINT"[UP
     2]";:GOTO120
87  122 IFWF=4THENINPUT"[SP]ULSE
     HI (0-255)[SPC8,LEFT6]";PH
DF  124 IFPH<0ORPH>255THENPRINT"
     [UP]";:GOTO122
31  126 IFWF=4THENINPUT"[SP]ULSE
     LO (0-255)[SPC6,LEFT6]";PL
21  128 PRINT:INPUT"[SF]REQUENCY
     (256-16572)[SPC6,LEFT6]";FR

66  130 IFFR<256ORFR>16572THENPR
     INT"[UP]";:GOTO130
20  135 FH=INT(FR/255):FL=FR-FH*
     256
04  140 W=WF*16+1
15  145 PRINT:PRINT"[SP]RESS [SR
     ,SE,ST,SU,SR,SN] TO QUIT OR
     ANY OTHER KEY TOCARRY ON"
A0  146 GETA$:IFA$=CHR$(13)THENP
     OKEV+24,0:END
C3  147 IFA$=""THEN146
F6  148 V=54272:POKEV+24,15
80  150 POKEV+5,A*16+D:POKEV+6,S
     *16+R
82  155 POKEV+2,PL:POKEV+3,PH
39  160 POKEV+4,0:POKEV+4,W
2C  165 POKEV+0,FL:POKEV+1,FH
50  170 PRINT:PRINT"[SP]RESS ANY
     KEY FOR [SA SD SS SR] DIAGR
     AM  AND WHEN"
97  175 PRINT"[UP]YOU'VE FINISHE
     D VIEWING THAT, PRESS
04  180 PRINT" ^ TO RETURN TO S
     ELECTION PROGRAM"
55  181 PRINT:PRINT"[SS]ORRY IT'
     S ALL A BIT SLOW, BUT ME AND
DA  182 PRINT"HIGH RES MIX LIKE
     OIL AND WATER     MY APOLOG
     IES"
E2  185 POKE198,0
52  186 GETA$:IFA$=""THEN186
54  190 GOSUB10
45  200 PRINTCHR$(14):GOTO102
63  300 V=0:B1=Y:A1=X
CF  301 IFX1=YTHENGOSUB300:RETUR
     N
57  302 A1=X+V:B1=Y-INT(V*RATIO)

5F  303 V=V+1:IFV>(X1-X)THENRETU
     RN
A6  304 RO=INT(B1/8):C=INT(A1/8)

43  305 L=B1AND7
CC  310 B=7-(A1AND7)
47  315 BYTE=8192+(RO*320)+(C*8)
     +L
28  320 POKEBYTE,PEEK(BYTE)OR(2^
     B)
64  325 GOTO302
28  350 FORI=XTOX1STEP2
D0  351 B1=Y1:A1=I
05  352 RO=INT(B1/8):C=INT(A1/8)

8D  355 L=B1AND7
72  360 B=7-(A1AND7)
28  365 BYTE=8192+(RO*320)+(C*8)
     +L
7A  370 POKEBYTE,PEEK(BYTE)OR(2^
     B)
FA  375 NEXT
17  380 FORI=Y1TOY1STEP2
4C  381 B1=I:A1=X
3C  382 RO=INT(B1/8):C=INT(A1/8)

F5  383 L=B1AND7
FA  384 B=7-(A1AND7)
8D  385 BYTE=8192+(RO*320)+(C*8)
     +L
2A  386 POKEBYTE,PEEK(BYTE)OR(2^
     B)
88  387 NEXT
08  388 RETURN

PLEASE NOTE THE ^ SIGN IS
THE UP ARROW KEY (NEXT TO *)
```

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Name
Age
Address
DISK ☐ TAPE ☐

RULES

[illegible]

Link Up

Here is the chance to link up a short-wave technical receiver and Commodore 64 to a Transceive interface and multimode receive program.

By Evelyn Mills

Before going into the finer details of this versatile system, it is helpful to know a few basic facts about the receiver. Firstly, what receiver is required? The market is open here with models ranging in price from £24 to £600. Regrettably the lower priced models will not function with interfaces/software of this type as certain basic criteria are required.

Your short-wave receiver should cover the range 1.8 - 30 MHz and it must have a detector to receive SSB (single side band) plus a CW filter for picking up morse. To tune to an exact frequency, a receiver with digital display is much more accurate.

Price Range

Having said all this, how much do you have to pay for such a model? Looking around a second hand market would be informative as there is a constant supply and demand. Our household model is a YAESU FRG7000 which costs around £200 second hand. (Remember that short-wave listening is a hobby within itself which users get a great deal of information and pleasure from.)

An acceptable receiver will set you back a minimum of £150 second-hand and should have all the above features including the facilities to use a good aerial and earth; the receiver used here was worked on a long wire antenna (40 metres) suitably grounded to reduce background noise.

Onto Computing

The interface, which is small and compact, plugs into the user port of the C64 and is connected to the audio output on the short wave receiver (cables and connectors are supplied). It has a single switch which controls three functions: one position sets the computer for CW reception, another for RTTY reception and the third for filter on/off. According to the data you wish to receive, set the switch accordingly and load the disk RX-4 program.

While the program is not lengthy, it is extremely compact and efficient in use. All of the commands function via a single key press, a list of which is given in the literature supplied. On loading, a status line is displayed at the bottom of the screen. Press R and this indicates that you are in RTTY (teletype) mode, a C press takes you to morse reception, an A press to AMTOR reception and a T press to download SSTV (slow screen television scans). The AMTOR mode will not be discussed here as it is very similar to RTTY.

Our main options are T, R and C. Inasmuch as morse transmissions were received and translated with considerable facility, let's get into the C option first.

To do this, set the interface switch to CW, then tune into the amateur bands available for morse transmission using the CW option on your receiver. These bands are listed in most short wave handbooks and the most successful were found to be the 3.0 - 3.150 MHz and 14.0 - 14.350 MHz bands. The software controlling reception has a filter selection of 700 Hz - 1360 Hz plus a filter Off mode; these are displayed at the bottom of the screen and are selected with single computer keys. There are also single key controls for setting word speed. For amateur morse, 20 w.p.m. or 40 w.p.m. should be used (depending on the speed of transmission). A speed setting capable of handling up to 250 w.p.m. is also available.

Let us assume that you have tuned into a good clear morse transmission. At the top left hand corner of your screen nothing is visible until tuning is perfect, at which point a flashing yellow cursor will appear and the morse transmission will now be translated to text on your screen (in English or the appropriate language — such conversations are regarded as confidential and may not be printed here). You will find the transmitter's call-sign printed out eventually, enabling you to locate his/her geographical position (with reference to handbook).

It should be remembered that many people use morse in an abbreviated form or even in coded form; furthermore you are just as likely to catch the end of a conversation as the beginning. In fact what you pick up is a matter of trial, error and chance!! The transmission may be locked on autotrack if need be.

During reception, when one screen is full, it is overwritten by subsequent data which allows fast decoding. All material can be saved to disk by pressing S — a bleep will be heard which should be followed by a single number a letter for program identification. The saving process then begins.

For output to the Commodore printer or MPS 801 press P either directly from the screen or from saved material. The buffer is reloaded with a 13 press which followed by O data will again be visible on screen. Approximately 22K may be stored which is more than adequate for most transmissions. RESTORE will clear the screen but not the memory, so if you have a lot of rubbish coming through initially due to excessive flicker and noise or inaccurate tuning you will find that this is saved as well within any one program – generally as E's, I's and asterisks. Should you search around bands other than the important ones you will find that information is transmitted in fast code.

The Teletype Selection

Switch the interface to RTTY, filter ON mode and press R for software selection. At the bottom of the screen you will find the RTTY definition plus at the lower right hand corner two cursors for tuning purposes. When a station is located a vertical black band will oscillate across the cursors to give very fine tuning – you are well on mark when the lines oscillate from left to right at a rapid rate. This will naturally vary with the intensity of the signal.

Once you are tuned to a station (handbook useful) the teletype message is then printed to screen. Most of the material I picked up was either coded or in German or Swedish. Experience is needed here to know when and where to get the English transmissions (uncoded).

Pressing T will give a full screen picture if any SSTV (slow scan TV) is being transmitted.

To be Recommended

This is a very dedicated hobby which requires a great deal of patience and computer time. Certainly the product marketed by Technical Software will not let you down. Technically everything functions very smoothly and the single key presses allow for rapid switching from mode to mode. Other key presses exist (F for figures, L for letters etc.) which are described in detail in the literature supplied; helpful data is also given for the novice. The cost of the interface and software is modest with respect to quality so if your interests lie in this direction the product can certainly be recommended.

Technical Software also have a log book available (a mini database with printer output) which is menu driven and a very good Morse Tutor, the latter allows characters to be taught in a simple manner: text may be typed at pre-selected speed, checked, errors highlighted and the result printed. A pitch adjustor is built into the system. The log book costs £8 on tape and the Morse Tutor £6. Add £2 to either for disk-based systems.

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Sprite Grabber

Want to use sprites from other programmes in your own games? This utility makes it easy for you to find and save them for later use

By J. MacDonald

Sprite Grabber is a useful utility for examining the sprites used in games The sprites once found can be SAVEd to disk or tape, LOADed back into some form of sprite editor and changed at will In this way you can build up a library of your favourite sprites from your favourite programs

Getting it in

Sprite Grabber is a machine code program presented here as two Basic Loaders These should be typed in using the SYNTAX CHECKER program that can be found on the LISTINGS page

Why two versions of the program? It s simply that they are both located at different addresses in case one happens to sit in the same area of memory as the sprites you want to grab

When the loaders have been RUN I suggest that you SAVE the machine code using a monitor or one of the following small Basic programs

For the version at address 49152

```
10 POKE 43, 0  POKE 44, 192
20 POKE 45, 198  POKE 46,35
```

For the version at address 16384

```
10 POKE 43, 0  POKE 44,64
20 POKE 45, 70  POKE 46, 64
```

Then SAVE the programs with

```
SAVE "SPRITE GRABBER" X 1
```

where X is 1 if using tape or 8 if using disk

The programs should be LOADed back to the address from where they were SAVEd to avoid corrupting any sprite data that may sit in the Basic area You do this with the following command

```
LOAD "SPRITE GRABBER" , X 1
```

where X is as before

Using the program

LOAD in the game with the sprites that you wish to examine Once LOADed and RUNning reset the computer using a reset switch, or a cartridge with a reset on it LOAD the SPRITE GRABBER program into memory at the address of your choice (49152 or 16384) and run the program with

```
SYS start address
```

where the start address is either 49152 or 16384 depending on the version of the program that you choose to use

A menu will now appear on the screen showing what the function keys do, 'R' and S' options and sprite information at the bottom

The function keys will allow the sprite pointer to be increased or decreased by one, sprite colours to be changed toggling between multicolour and hi-res mode and toggling the XY expansion of the sprite BANK switching is achieved by pressing numeric keys 0 3 as shown on the screen At all times the sprite pointer BANK and sprite address is displayed on the screen

If you find a series of sprites that you like which might be an animation like a man walking use F1 to display the first sprite in the series and then press R to save the start pointer Now use F1 to move the sprite pointer to the last sprite you want to save and press R' again to indicate the end of the series Pressing S' will now activate the SAVE section of the program This will prompt you for Tape or Disk — press the appropriate letter and you will be asked for a filename (16 characters max) Your series of sprites will now be SAVEd.

If you try to SAVE from a high to a low address you will be notified of an error — press any key to try again

Sprites can be SAVEd from anywhere in memory, including under the ROMs So remember unless you are loading the sprites from a program which will redirect them to a new address they will LOAD into the area they originally came from — with possibly unforeseen results

```
PROGRAM  GRABBER 16384

6F   10 I=16384
2E   20 READ A IF A=256 THEN END
57   30 POKE I A I=I+1 GOTO 20
E3   16384 DATA 169 0 141 249 7,1
     41,250,7
47   16392 DATA 141 251 7 141 32,
     208 141 33
0D   16400 DATA 208 141 29,208,14
     1 23,208 169
15   16408 DATA 1 141 21,208 141
     38 208 169
D1   16416 DATA 64 141 0 208,169
     100 141 1
7C   16424 DATA 208 169 5,141,39
     208 169 0
41   16432 DATA 141 37 208 32,210
     255 169 13
76   16440 DATA 141 248 7,169,0 1
     33 252 169
E5   16448 DATA 0 133 253 169 64
     133 53 169
A6   16456 DATA 3 133,54,169,103,
     133 250 169
E2   16464 DATA 64 133 251,169 14
     7,32 210,255
6F   16472 DATA 160,0 177 250 240
     12 32 210
52   16480 DATA 255 230 250 208 2
     49 230 251 76
D0   16488 DATA 90,64,76,225,66 1
     45 32 83
15   16496 DATA 80 82,73,84,69 32
     71 82
89   16504 DATA 65 66,66,69 82 32
     69 89
30   16512 DATA 32 74,65 77,69 83
     ,32 77
4E   16520 DATA 65 67,68 79,78 65
     76 68
E4   16528 DATA 32 49 57 56,54 13
     ,17 32
84   16536 DATA 152 184 184 184 1
     84 184 184 184
37   16544 DATA 184 184 184 184,1
     84 184 184,184
8F   16552 DATA 184 184 184 184 1
     84 184 184 184
A7   16560 DATA 184 184 184 184 1
     84,184,184,184
36   16568 DATA 184 184 184 184 1
     84 184 184,13
A0   16576 DATA 17 32 32 32 32 32
```

```
    ,32 32
EF  16584 DATA 32,32,32 32 32 32
     32 32
53  16592 DATA 32 32 32,31 70 49
     145 45
83  16600 DATA 73 78,67,32 83 80
     ,82 73
AA  16608 DATA 84,69,32 80 79 73
     78 84
80  16616 DATA 69 82 13,32 32 32
     32 32
27  16624 DATA 32,32 32 32 32,32
     ,32 32
D4  16632 DATA 32,32 32,32 32,31
     ,70 50
AF  16640 DATA 145 45,68 69,67 3
    2 83,80
AA  16648 DATA 82 73 84 69 32 80
     79 73
A3  16656 DATA 78 84,69 82 13,32
     32,32
B6  16664 DATA 32 32 32,32 32 32
     32 32
B0  16672 DATA 32,32,32 32 32 32
     32,31
83  16680 DATA 70 51 145 45 73,7
    8,67 32
76  16688 DATA 83,80,82,73 84,69
     ,32 67
E2  16696 DATA 79 76 35,48,13,32
     32,32
2E  16704 DATA 32 32 32 32,32 32
     ,32 32
35  16712 DATA 32 32,32 32 32 32
     32,31
38  16720 DATA 70 52 145 45 73 7
    8,67 32
3E  16728 DATA 83 80,82 73,84 69
     ,32 67
7D  16736 DATA 79,76,35 49,13 32
     32,32
56  16744 DATA 32 32 32,32 32,32
     ,32 32
3D  16752 DATA 32,32,32,32 32 32
     32,31
E1  16760 DATA 70 53 145 45,73,7
    8,67 32
86  16768 DATA 83 80 82 73 84 69
     ,32 67
3A  16776 DATA 79 76,13 32,32 32
     32 32
3E  16784 DATA 32 32,32 32 32 32
     32,32
81  16792 DATA 32,32,32 32 32,31
     ,70 54
3F  16800 DATA 145 45 84 79,71 7
    1,76 69
A5  16808 DATA 32,77,85,76 84,73
     32 67
50  16816 DATA 79,76 70 13 32,32
     ,32 32
A6  16824 DATA 32 32,32 32 32 32
     32,32
AF  16832 DATA 32 32,32 32 32 32
     31 70
A8  16840 DATA 55,145,45 84 79 7
    1 71 76
61  16848 DATA 69,32 88 32,69,88
     ,80 65
8A  16856 DATA 78 68 13,32 32,32
     32,32
4E  16864 DATA 32 32 32 32 32 32
     32,32
D3  16872 DATA 32,32,32,32 32,31
     70,56
EF  16880 DATA 145,45 84 79 71,7
    1 76 69
8E  16888 DATA 32,89,32,69,88,80
     ,65 78
B2  16896 DATA 68 13,17 17,17,17
     ,75 69
4E  16904 DATA 89 83 32 48 45,51
     32 84
FC  16912 DATA 79 32 83 87 73 84
     67,72
E7  16920 DATA 32 66,65 78 75,83
     13,35
C2  16928 DATA 83,35,32 84,79 32
     ,83 65
7A  16936 DATA 86 69 32 83 80 82
     ,73 84
3F  16944 DATA 69,83 32 66,69 84
     ,87 69
B2  16952 DATA 69 78 32 77,65,82
     75 69
D3  16960 DATA 82,83,13 35 82 32
     ,32 84
DC  16968 DATA 79 32,83,69,84 32
     ,82,65
F5  16976 DATA 78 71,69 32 84 79
     ,32 83
20  16984 DATA 80 82 73 84,69 83
     32 70
03  16992 DATA 79,82 32 83 65 86
     ,69 13
68  17000 DATA 17 151 67,85,82 8
    2 69 78
6A  17008 DATA 84 32 66,65 78 75
     32 32
EF  17016 DATA 32,73,83,32 32,5,
    48 32
7F  17024 DATA 32 32 32 32 32 31
     77 65
3F  17032 DATA 82 75 69,82 83,13
     ,32 32
05  17040 DATA 32,32 32 32,32 32
     32,32
CD  17048 DATA 32 32,32 32 32 32
     ,32,32
A3  17056 DATA 32,32,32 32,32,32
     32,5
3F  17064 DATA 70 82 79 77 32,32
     ,32 84
13  17072 DATA 79 151 13 83,80 8
    2 73,84
3F  17080 DATA 69,32 80 79 73 78
     84 69
14  17088 DATA 82 32,73,83 32 32
     5,48
81  17096 DATA 151 13 17 83 80 8
    2,73,84
AE  17104 DATA 69 32 65 68 68 82
     69 83
A0  17112 DATA 83 32 73 83 32 32
     ,5,48
48  17120 DATA 0,120 169 52 133
    1 169 63
E9  17128 DATA 177 252 145 53 13
    6,16 249 169
7E  17136 DATA 55 133 1,88,24 16
    2 23 160
78  17144 DATA 20 32 242 255 32
    80 60 169
54  17152 DATA 0,174 230 7 32 20
    5 183 24
40  17160 DATA 152,23 160 32 32
    242 255 32
52  17168 DATA 60 68,169 0 174 2
    51 7,32
23  17176 DATA 205 189,32,220 25
    5 240,251,201
73  17184 DATA 83 208 3,76,120 5
    0 201 82
F0  17192 DATA 208 3,76 172 69,2
    01 133 208
D8  17200 DATA 0,165 1 141,21 60
     76 20
8C  17208 DATA 68 201 137,208 0,
    165 255,141
81  17216 DATA 21 60 76 20,60 20
    1 134 208
A8  17224 DATA 3 230,37 208 201
    130,208 3
34  17232 DATA 230,38,208,201 13
    5,208 3 230
50  17240 DATA 30 200 201 135 24
    0 128 201 136
3A  17248 DATA 240,128,201 140,2
    40 187 201 48
FD  17256 DATA 208 5 165 0 76 13
    5 67 201
E5  17264 DATA 48 208,5 165 64 7
    6 135 67
5A  17272 DATA 201 50 208 5 169
    128 76 135
C0  17280 DATA 67 201 51 208 5 1
    69,192 141
AF  17288 DATA 22,60 32 85,60 16
    5 253 41
51  17296 DATA 63 13 22 60,133,2
    53 24 162
EF  17304 DATA 24 160,10 32,240
    255 32 60
36  17312 DATA 56 165 253 166 25
    2 32 205 189
D4  17320 DATA 166 253 74 74,74
    74 74 74
44  17328 DATA 141,20 60 24,162
    20 160 19
D1  17336 DATA 32,240,255 174,20
     60 169 0
F0  17344 DATA 32,205,189,76 225
    ,66,173 23
C3  17352 DATA 208 73 255,141,20
     208 76,225
87  17360 DATA 66,173 23,208 73
    255 141 23
19  17368 DATA 208 76,225 66,173
     29 208 73
20  17376 DATA 255 141 29 208 24
    ,162 5 160
B4  17384 DATA 34,32,240,255 162
    ,2,173,20
CC  17392 DATA 208 41,1 240 12,1
    89 16 60
1E  17400 DATA 32 210 255 202 16
    ,247 76 225
47  17408 DATA 66 189,13 60 32 2
    10 255,202
E1  17416 DATA 16 247,76 225 66
    70 78 75
4A  17424 DATA 32 70 78 84,0 1 0
    ,0
6A  17432 DATA 0 0 0,0 24,173,24
    9 7
87  17440 DATA 109,21 60,141 249
    7 24 162
DA  17448 DATA 22 160 19 32 240
    255 32 60
E3  17456 DATA 60 174 249 7 169
    0 32 205
5A  17464 DATA 189 76,138,67 162
     12 189 72
4E  17472 DATA 60 32 210,255 202
    ,16 247 96
D1  17480 DATA 5 157 157,157,157
     157 157 32
C5  17488 DATA 32 32 32 32 32 16
    2 5 173
08  17496 DATA 249,7,141 118,60
    169 0 141
8A  17504 DATA 113 69 14 118 60
    46,119 60
32  17512 DATA 202 16 247 173 11
    9 60 133 253
2D  17520 DATA 174,118,60 134 25
    2 56 0 0
69  17528 DATA 173 25 60 205 27
    60 144 52
EA  17536 DATA 240 3 76 141 68 1
    73 24 60
A6  17544 DATA 205 26,60 144 35,
    32 163 65
EC  17552 DATA 162,0 185,185 60,
    32 210 255
E8  17560 DATA 232 224 15 208 24
    5,32 220 255
0F  17568 DATA 240 251,76 131 69
    73 78 86
```

```
AD  17576 DATA 65,76,73,88,32,77
    ,65,82
70  17584 DATA 79,83,82,83,155,0
    141,21
B5  17592 DATA 200,32,163,65,162
    ,0,189,230
0A  17600 DATA 88,32,210,255,232
    224,16,208
1A  17608 DATA 245,32,228,255,24
    0,251,201,84
F7  17616 DATA 208,5,162,1,76,22
    1,68,201
47  17624 DATA 68,208,238,162,0,
    169,1,160
4B  17632 DATA 255,32,186,255,16
    2,0,142,50
4C  17640 DATA 65,185,246,69,32,
    210,255,232
A8  17648 DATA 224,13,208,245,16
    2,0,169,113
5E  17656 DATA 32,210,255,32,228
    255,240,251
54  17664 DATA 201,13,240,81,201
    ,48,240,14
76  17672 DATA 201,31,176,3,76,2
    51,68,201
E9  17680 DATA 127,144,32,76,251
    68,173,50
ED  17688 DATA 65,240,224,160,0,
    165,46,65
F5  17696 DATA 32,210,255,200,15
    2,4,208,245
81  17704 DATA 206,50,65,76,246,
    68,157,32
28  17712 DATA 157,157,0,72,173,
    50,68,201
23  17720 DATA 16,208,4,184,76,2
    51,68,165
36  17728 DATA 157,32,210,255,17
    3,50,65,170
8D  17736 DATA 184,157,21,70,32,
    210,255,230
74  17744 DATA 50,68,76,246,68,1
    68,13,162
36  17752 DATA 3,32,210,255,202,
    16,208,173
56  17760 DATA 50,68,162,21,160
    70,32,183
43  17768 DATA 255,173,24,68,133
    250,173,25
62  17776 DATA 68,133,251,174,26
    68,172,27
72  17784 DATA 68,165,250,32,216
    ,255,165,1
EA  17792 DATA 141,21,208,32,163
    65,160,10
25  17800 DATA 162,10,189,2,70,3
    2,210,255
45  17808 DATA 202,16,247,136,16
    242,163,32
C0  17816 DATA 162,160,157,223,5
    ,202,208,250
C3  17824 DATA 76,225,66,24,162,
    5,160,0
20  17832 DATA 32,240,255,56,173
    23,68,208
8D  17840 DATA 24,173,248,7,141
    250,7,165
CE  17848 DATA 252,141,24,68,165
    ,253,141,25
28  17856 DATA 68,169,1,141,23,6
    8,76,225
1E  17864 DATA 66,173,248,7,141
    251,7,24
43  17872 DATA 165,252,105,64,14
    1,26,68,165
DF  17880 DATA 253,105,0,141,27
    68,165,0
8D  17888 DATA 141,23,68,76,225,
    66,40,84
0B  17896 DATA 41,65,80,65,32,79
    ,82,32
C3  17904 DATA 40,65,41,73,83,75
    ,13,78
8A  17912 DATA 73,76,69,78,65,77
    ,69,32
51  17920 DATA 83,17,13,32,32,32
    ,32,32
C1  17928 DATA 32,32,32,32,32,32
    32,32
83  17936 DATA 32,32,32,32,32,32
    32,32
51  17944 DATA 32,32,32,32,32,32
    32,32
75  17952 DATA 32,0,255,255
```

PROGRAM GRABBER 49152

```
6C  10 I=49152
2E  20 READ A:IF A=256 THEN END
57  30 POKE I,A:I=I+1:GOTO 20
63  49152 DATA 169,0,141,248,7,1
    41,250,7
C7  49160 DATA 141,251,7,141,32
    208,141,33
8D  49168 DATA 208,141,28,208,14
    1,23,208,169
55  49176 DATA 1,141,21,208,141
    39,208,165
51  49184 DATA 64,141,0,208,169,
    100,141,1
FC  49192 DATA 208,169,6,141,38
    208,169,0
C1  49200 DATA 141,37,208,32,210
    ,255,169,13
F6  49208 DATA 141,240,7,169,0,1
    33,252,169
65  49216 DATA 0,133,253,169,64,
    133,53,169
86  49224 DATA 3,133,54,169,100,
    133,250,169
30  49232 DATA 192,133,251,169,1
    47,32,210,255
EF  49240 DATA 160,0,177,250,240
    ,12,32,210
12  49248 DATA 255,230,250,208,2
    45,230,251,76
58  49256 DATA 90,192,76,225,194
    ,145,32,83
55  49264 DATA 80,82,73,84,69,32
    ,71,82
89  49272 DATA 65,66,66,69,82,32
    ,66,89
89  49280 DATA 32,74,65,77,69,83
    ,32,77
CE  49288 DATA 65,67,68,79,78,65
    76,68
54  49296 DATA 32,49,57,56,54,13
    17,32
84  49304 DATA 152,184,184,184,1
    84,184,184,184
17  49312 DATA 184,184,184,184,1
    84,184,184,184
1F  49320 DATA 184,184,184,184,1
    84,184,184,184
27  49328 DATA 184,184,184,184,1
    84,184,184,184
16  49336 DATA 184,184,184,184,1
    84,184,184,13
20  49344 DATA 17,32,32,32,32,32
    ,32,32
3F  49352 DATA 32,32,32,32,32,32
    32,32
13  49360 DATA 32,32,32,31,70,49
    149,45
E3  49368 DATA 73,78,67,32,83,80
    82,73
2A  49376 DATA 84,69,32,80,79,73
    ,78,84
30  49384 DATA 69,82,13,32,32,32
    32,32
A7  49392 DATA 32,32,32,32,32,32
    32,32
54  49400 DATA 32,32,32,32,32,31
    ,70,50
2F  49408 DATA 149,45,68,69,67,3
    2,83,80
2A  49416 DATA 82,73,84,69,32,80
    79,73
23  49424 DATA 78,84,69,82,13,32
    32,32
A6  49432 DATA 32,32,32,32,32,32
    32,32
8D  49440 DATA 32,32,32,32,32,32
    32,31
83  49448 DATA 70,51,149,45,73,7
    8,67,32
F6  49456 DATA 83,80,82,73,84,69
    ,32,67
02  49464 DATA 79,76,35,48,13,32
    ,32,32
AE  49472 DATA 32,32,32,32,32,32
    32,32
85  49480 DATA 32,32,32,32,32,32
    32,31
00  49488 DATA 70,52,149,45,73,7
    8,67,32
0E  49496 DATA 83,80,82,73,84,69
    32,67
FD  49504 DATA 79,76,35,49,13,32
    32,32
D6  49512 DATA 32,32,32,32,32,32
    32,32
1D  49520 DATA 32,32,32,32,32,32
    ,32,31
A1  49528 DATA 70,53,149,45,73,7
    8,67,32
86  49536 DATA 83,80,82,73,84,69
    32,67
1A  49544 DATA 79,76,13,32,32,32
    32,32
8E  49552 DATA 32,32,32,32,32,32
    32,32
01  49560 DATA 32,32,32,32,32,31
    70,54
EF  49568 DATA 149,45,84,79,71,7
    1,76,69
25  49576 DATA 32,77,85,76,67,32
    ,32,5
10  49584 DATA 79,78,70,13,32,32
    ,32,32
26  49592 DATA 32,32,32,32,32,32
    32,32
27  49600 DATA 32,32,32,32,32,32
    31,70
28  49608 DATA 55,149,45,84,79,7
    1,71,76
E1  49616 DATA 69,32,88,32,69,88
    80,65
3A  49624 DATA 78,68,13,32,32,32
    32,32
CE  49632 DATA 32,32,32,32,32,32
    32,32
53  49640 DATA 32,32,32,32,32,31
    70,56
BF  49648 DATA 149,45,84,79,71,7
    1,76,69
3E  49656 DATA 32,89,32,69,88,80
    65,78
82  49664 DATA 68,13,17,17,17,17
    75,65
CE  49672 DATA 85,83,32,48,45,51
    32,84
7C  49680 DATA 79,32,83,87,73,84
    ,67,72
87  49688 DATA 32,66,65,78,75,83
    13,39
42  49696 DATA 83,39,32,84,79,32
    83,65
FA  49704 DATA 86,69,32,83,80,82
    73,84
8F  49712 DATA 69,83,32,66,69,84
    87,69
E2  49720 DATA 69,78,32,77,65,82
    75,69
53  49728 DATA 82,83,13,39,82,39
```

```
      32 84
5C  49736 DATA 79 32,83 69 84 32
      82 65
35  49744 DATA 78 71 69,32,78 70
     ,32 83
A8  49752 DATA 80,82,79,84,88 83
     ,32,78
83  49760 DATA 79,82,32,83,65 86
      69 13
E8  49768 DATA 17 161 67 65,82,8
    2 69,78
EA  49776 DATA 84 32 66 65,78,75
      32,32
EF  49784 DATA 32 73,83 32 32 5,
    48 32
FF  49792 DATA 32 32 32,32,32 31
     ,77 65
8F  49800 DATA 82 75,69 82 83 13
     ,32 32
05  49808 DATA 32,32,32,32 32 32
     ,32 32
4D  49816 DATA 32 32 32,32 32 32
      32 32
29  49824 DATA 32,32 32,32,32 32
      32 5
1F  49832 DATA 70 82 79,77,32,32
      32 84
53  49840 DATA 79,161 13 83 68,8
    2 73,84
1F  49848 DATA 69,32 68 79,73,78
     ,84,69
34  49856 DATA 82,32,73 83,32 32
     5 48
81  49864 DATA 161,13,17,83 80 8
    2 73 84
2E  49872 DATA 69 32 85 69 68 82
     69 83
2D  49880 DATA 83 32,73,83 32,32
     5 48
C0  49888 DATA 0 120,160,52 133
    1 160 63
63  49896 DATA 177,252,145,53 13
    6,16 249,169
FE  49904 DATA 55,133,1 80,24,18
    2,29 160
45  49912 DATA 26 32,240,255,32
    60 196 169
14  49920 DATA 0,174,250,7 32,20
    5,188 24
C0  49928 DATA 162 29,160,32,32,
    240 255,32
4E  49936 DATA 60 196,165 0,174,
    251,7 32
A3  49944 DATA 205 165,32,228,25
    5,240 251 201
AF  49952 DATA 83 208 3 76,120,1
    96 201 82
85  49960 DATA 208,3 76 172 197
    201 133 208
FF  49968 DATA 8 169 1 141,21,19
    6 76 29
88  49976 DATA 190 201 137 208 8
     169 255 141
45  49984 DATA 21 196,76 20,196,
    201 134 208
20  49992 DATA 3 230,37 208 201,
    136 208 3
84  50000 DATA 230 30 208,201 13
    5,208,3 230
10  50008 DATA 39 208 201 135,24
    0 126 201 136
8A  50016 DATA 240 100 201 140 2
    40 107 201,40
A5  50024 DATA 209,5 169,0 76,13
    5 195 201
A5  50032 DATA 45,208,5 169 64,7
    6,135 195
DA  50040 DATA 201 58,208 5,169,
    128 76 135
F8  50048 DATA 195 201,51 208 5,
    169,192 141
45  50056 DATA 22 196,32 85 195,
    165 253 41
D9  50064 DATA 63,13,22,196,133,
    253 24 162
6F  50072 DATA 24 160 19 32 240,
    255 32 60
72  50080 DATA 198 165 253,166,2
    52 32,205 189
04  50088 DATA 165 253 74,74 74
    74 74,74
6A  50096 DATA 141 20 198 24 162
    ,20 160 18
69  50104 DATA 32,240 255 174 20
    ,196 165 0
8A  50112 DATA 32 205 189 76,225
     194 173 20
43  50120 DATA 208 73 255 141 25
    ,208 76,225
78  50128 DATA 194,173,23 208 73
     255 141,23
8D  50136 DATA 208 76,225 194 17
    3 20 208 73
38  50144 DATA 255 141,20 208 24
     162 0 160
34  50152 DATA 34,32,240 255 162
    ,2 173 20
8C  50160 DATA 208,41,1 240,12,1
    89 16,196
56  50168 DATA 32,210 255,202,16
     247,76 225
D5  50176 DATA 194 189 13,196 32
    ,210 255 202
8D  50184 DATA 16 247 76,225,194
     78 78 79
C9  50192 DATA 32,78,79,64 0 1 0
    0
EA  50200 DATA 0 0 0,0 24,173,24
    9,7
50  50208 DATA 109 21 196 141,24
    9,7 24,162
5A  50216 DATA 22,160 19 32 240,
    255 32 60
D7  50224 DATA 196,174,248 7,189
    ,0 32,205
69  50232 DATA 189 76,138,195,16
    2 12 185,72
32  50240 DATA 198,32,210,255 20
    2 16,247 96
51  50248 DATA 5,157,157,157,157
    ,157,157,32
45  50256 DATA 32 32,32 32 32 16
    2 5,173
03  50264 DATA 249,7 141 118 196
     169 0,141
E2  50272 DATA 119,196 14,118,19
    6 46 119,196
0A  50280 DATA 202,16 247,173 11
    9 196,133 253
61  50288 DATA 174 118,196,134,2
    52 96 0 0
35  50296 DATA 173 25 198,205 27
     196 144 52
CA  50304 DATA 240 3,76 141,199,
    173 24 198
F3  50312 DATA 205 26 196 144 39
    ,32 163,197
92  50320 DATA 162,0 169 165 196
     32 210 255
60  50328 DATA 202,224 15 208 24
    5 32 228 255
E5  50336 DATA 240 251,76,191 19
    7 73 78 86
2D  50344 DATA 65,76,73,68,32 77
    ,65,82
F0  50352 DATA 75 68,82 83,169,0
    ,141 21
55  50360 DATA 228 32,183 157,16
    2 0 189 230
96  50368 DATA 157 32 210 255 23
    2 224 16 208
5A  50376 DATA 245,32 228,255,24
    0 251 201 84
27  50384 DATA 208,8,162 1,76,22
    1,196 201
C7  50392 DATA 68,208,230,162,8,
    169,1,157
C8  50400 DATA 255,32 186 255 16
    2 0 142 90
C2  50408 DATA 157 169 248 197,3
    2,210 255 232
20  50416 DATA 224 13 208 245,16
    2 0 165 113
DE  50424 DATA 32,210 255,32 228
     255 240 251
84  50432 DATA 201,13,240 81,201
    ,20 240 14
58  50440 DATA 201 31 176 3 76,2
    51,196 201
5D  50448 DATA 127 144,32 76 251
     196 173,58
E7  50456 DATA 157 240,224,169,0
    ,185 46,157
75  50464 DATA 32 210,255,208,19
    2 4 208,245
D5  50472 DATA 206 58,157,76,246
     198 157 32
5D  50480 DATA 157,157,0,72 173
    58 157 201
81  50488 DATA 16,224,4,184,76 2
    51 196 169
F4  50496 DATA 157 32 210 255 17
    3 58 197 170
18  50504 DATA 184 157,21,190 32
     210 255,238
A8  50512 DATA 58 157 76,246,196
     169,13,162
B6  50520 DATA 9,32,210,255,222
    16,250 173
EE  50528 DATA 58 157 162,21 160
     196 32,169
01  50536 DATA 255 173 24 196 19
    3 250,173 25
20  50544 DATA 196 133 251 174,2
    6 196 172 27
56  50552 DATA 196,169,250 32,21
    6 255 169,1
8F  50560 DATA 141 21,208,32 163
    ,197 160,10
38  50568 DATA 162 10 185 2 196

    32 210 255
C6  50576 DATA 202 16 247 196 16
     242 165 32
40  50584 DATA 162,160 157,229 9
    ,202 208 250
69  50592 DATA 76,228 194,24 162
     5 160 0
F6  50600 DATA 32 240,255 96,173
     23 196,208
8D  50608 DATA 24 173 249 7 141,
    250 7 169
08  50616 DATA 252 141 24 196 16
    5 253 141 25
72  50624 DATA 196 169 1 141,23,
    196 76 225
3A  50632 DATA 194 173 249,7 141
     251,7 24
19  50640 DATA 165,252 105,64,14
    1 26,196,165
38  50648 DATA 253,105 0 141 27
    196 169 0
05  50656 DATA 141 23,196,76 225
     194 42 84
58  50664 DATA 41 65 80,69 32 78
    ,82,32
43  50672 DATA 40,68 41,73,83 75
     13 78
8A  50680 DATA 73 76 69 78 65 77
     69,32
D1  50688 DATA 63,17 13,32,32,32
     32 32
41  50696 DATA 32 32 32 32 32 32
     32,32
83  50704 DATA 32 32,32,32 32 32
    ,32 32
D1  50712 DATA 32 32,32,32 32 32
     32 32
F5  50720 DATA 32 0 255,256
```

commodore

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TROJAN

Hook-Ups

Continuing our series, we look at the possibilities of using the BBC as an intelligent disk drive interface between the C64 and itself.

By Mycroft Appleby

Last month I explained the general principals of parallel communications, the terminology and the method that I was going to use in the series. Also I included as an example a simple memory transfer program for the C64 and BBC micro.

This month I'll look at a more practical application of the system. If there are two things that are different in the C64 and BBC Micro it is speed and more specifically disk speed. The BBC Micro has one of the fastest and cheapest disk systems on any home micro. The Commodore 64 on the other hand doesn't have disk drives at all. Oh they may look like disk drives. But in reality there are little hamsters inside that disk drive shaped box, that listen to the information coming down the serial bus and scratch it on the surface of the disk in shorthand.

This breed of hamster is very rare and was bred specifically by Commodore for the task. One of the stranger things about this breed (Hamstradus Floppus) is that they live on the paper envelopes that disks usually come in. If you don't believe me, count the number of disks that you've got, then count the number of envelopes – see! Further proof is evident when you swap disks in the middle of a 'read or write' operation. The miniature hamsters hammer on the roof of the box to get you to stop.

So with these two things in mind it should be possible to use the BBC Micro as an intelligent disk drive interface between the C64 and the BBC Disk Drive, all you need is some clever software and the appropriate transmition protocol.

There is a small Basic program in the C64 and the main program on the BBC Micro. This is for two main reasons. Firstly you can load 1K of data into a BBC Micro and then port it onto a C64 a lot faster, problems that you get with Basic getting confused with machine code. The second reason is that this series isn't designed to give complete solutions to problems but rather to supply the tools and the information to do the job. For this the code must be in Assembler format rather than strings of hex digits, so that you can see how it works. Most C64 assemblers are incompatible with each other and interfere with the system to such a degree that once the assembler has taken a chunk out of the memory map and written all over the pointers you haven't a clue where you are.

So the program is in the standard BBC format assembler. The C64 boot program is only slightly different from the one published last month, only locations and amounts have been changed. Some of the code on the BBC side may also be familiar as I used many of the principals which were discussed last month.

Starting Up

To load the software into both machines first load "Boot" into the Commodore 64 and load "Disk" into the BBC Micro. Run "Boot" and then run "Disk". After about 35 seconds the code will have assembled into the BBC, been transferred to the C64 and then the BBC side will have been re-assembled and initialised for the BBC.

On the BBC screen at this point you will see a message indicating the buffer size and a number. This is the number of bytes in the buffer and indicates the maximum program size you can load or save plus 256 bytes for the header packet (which I've explained later). Do not excede this. To increase the buffer size most of the error checking has been removed.

On the C64 side you should have returned to the Ready prompt. Typing 'SYS 49152' in the time honoured way will initialise the system.

At this point the vectors inside the machine that handle the loading and saving will have been slightly altered. Tape and disk (if appropriate) will work as normal, as will all other device addresses except '8'. This will transfer your program onto the BBC's currently selected drive in the blink of an eye. Likewise loading with a device number of 8 will load from the disk into memory as normal. Verifying is not possible however due to the 'burst' transmition of the data (i.e. the data goes back and forth in one great chunk and it is difficult to compare it on a 'byte for byte' basis).

Alterations

If you have a disk drive already attached and want to use it also then you can change the device number of the BBC very simply. In the sections 'BLODE' and 'BSAV' in the C64 half of the program you will see that the memory location 'device' is compared to '&08'. This is the device number. Change this to whatever number you want above three (the system's choice not mine) and you are there. A good choice (and one I use myself) is seven as not a great deal seems to use this device number.

How it works

Remember how last month in the header packet of the transmitted data as well as where to and how long the packet also had a byte called 'cmd'. Well, this is the command byte. In this new system when the data comes flooding into the BBC, it looks at this byte and if it is a one it knows to save the data. The first 256 bytes of the data is special and holds various information about the data, including the name it is to be saved under. This is extracted and the data is saved.

If the cmd number is two, then that is a load request. In this case only the 256 byte header packet is sent complete with various information about the program as well as its name again. The C64 then just sits there and waits. In this program it doesn't return to Basic but you can have it so you get full Basic control right away and the program just appears in memory when it's ready. This system works well but needs a lot of care to operate it.

'Iloop' is the area to watch. Change the finishing off to operate in the IRQ loop and perform a manual relink and you are away – parallel processing at last.

However, back to the plot. When the BBC has found the program on disk it prepares a packet with a cmd of three and sends it to the C64. The C64 knows that three means 'incoming program data' and treats it accordingly.

A cmd of zero will force a memory dump in any direction, just follow the instructions for last month; this is amusing for swapping screens and messages or changing somebodies character set.

Protocols

The transfer packet looks like this:

data lo \ Address where data is going
data hi /

len lo \ Length of data
len hi /

cmd Command Byte

The program packet (first 256 bytes) looks like this:

Header +	Name	Function
0	sa	Secondary address
1	drive	Destination drive (unused)
2-18	name	Filename
19-20	start	Origin start address of program
21-22	end	Origin end address of program
23-255	free	Reserved for future expansion

Next Time

I hope this system is of some use. I can't abide my hamster drives any more; the BBC drive is so much faster. Next installment I'll see what else I can dream up.

```
PROGRAM  BOOI

5 REM C64/BBC BOOT PROGRAM
10 POKE56578,0 X=PEEK(56576)
20 POKE56576,147 L=49152
30 FORB=0TO1023
40 IF(PEEK(56589)AND16)=0THEN40
50 I=PEEK(56577) POKEL+B,I
60 POKE56576,151 POKE56576,147
70 NEXTB
80 END
```

```
   10REM****************************
***
   20REM**
**
   30REM**          Beeb-Disk
**
   40REM**
**
   50REM**   C64 to  BBC Micro
**
   60REM**   and disk drive
**
   70REM**   system.
**
   80REM**
**
   90REM**  Mycroft Appledy 1987
**
  100REM**
**
  110REM****************************
***
  120
  130CLS:PRINT Buffer space avai
lable =  :HIMEM-PAGE-&2400
  140DIM CODE &0800,C64code &400
0
  150irq2v=&206:oldv=&F8:flag=&7
0:port &FE60
  160ddr=port+2:pcr=port+12:ifr=
port+13:ier=port+14
  170FOR PASS=0 TO 2 STEP 2
  180P%=CODE
  190[OPT PASS
  200.setup sei
  210lda irq2v
  220sta oldv
  230lda irq2v+1
  240sta oldv+1
  250lda #newv MOD 256
  260sta irq2v
  270lda #newv DIV 256
  280sta irq2v+1
  290lda #128+16
  300sta ier
  310cli
  320rts
  330\
  340.RESET sei
  350lda oldv
  360sta irq2v
  370lda oldv+1
  380sta irq2v+1
  390cli
  400rts
  410\
  420.newv lda ifr
  430and #128+16
  440cmp #&80
  450beq finirq
  460sta ifr
  470lda #&01
  480sta flag
  490.finirq jmp (oldv)
  500\
  510.get lda #00
  520sta flag
  530.loop1 lda flag
  540beq loop1
  550lda #&00
  560sta flag
  570rts
  580\
  590 TRANSFER jsr setup
  600lda #255
  610sta ddr
  620lda #128+64+32
  630sta pcr
  640ldx #&00
  650.loop2 lda C64code,X
  660jsr wbyte
  670jsr get
  680inx
  690bne loop2
  700.loop3 lda C64code+256,X
  710jsr wbyte
  720jsr get
  730inx
  740bne loop3
  750.loop4 lda C64code+512,X
  760jsr wbyte
  770jsr get
  780inx
  790bne loop4
  800.loop5 lda C64code+768,X
  810jsr wbyte
  820jsr get
  830inx
  840bne loop5
  850rts
  860\
  870.wbyte sta port
  880lda #128+64
  890sta pcr
  900lda #128+64+32
  910sta pcr
  920rts
  930]
  940NEXT PASS
  950:
  960REM Start of C64 code to be
 ported
  970:
  980port=&DD01:ddr=&DD03:pa2=&D
D00:flag1=&DD0D
  990data=&F7:len=&F9:from=&FB:i
mage=&0338:half=&0339:cmd=&033A
 1000irqv=&0314:oldirqv=&0334:lo
adv=&0330:savev=&0332
 1010CSAV=&F5ED:sa=&B9:flen=&B7:
RAD_NAME=&F7D0:SAV_MSG=&F68F:sad
d=&C1
 1020eadd=&AE:device=&BA:header=
&CP00:name=&B8
 1030bstart=&2B:LD MSG &F5D2:CLO
DE &F4D5:NO_FILE=&F713:iv=&93
 1040FOR PASS=4 TO 6 STEP 2
 1050P% &C000:O%=C64code
 1060[OPT PASS
 1070.SETUP sei
 1080ldx irqv
 1090stx oldirqv
 1100ldx irqv+1
 1110stx oldirqv+1
 1120ldx #(NEWIRQ MOD 256)
 1130stx irqv
 1140ldx #(NEWIRQ DIV 256)
 1150stx irqv+1
 1160cli
 1170ldx #&00
 1180stx flag
 1190jsr SET_RECEIVE_MODE
 1200jsr CHANGE_VECTORS
 1210rts
 1220\
 1230 NEWIRQ pha
 1240lda flag1
 1250and #&10
 1260cmp #&00
 1270beq noirq
 1280txa
 1290pha
 1300tya
 1310pha
 1320lda #&00
```

```
1330sta half
1340lda port
1350and #&80
1360sta image
1370jsr SHAKE
1380jsr STDATA
1390pla
1400tay
1410pla
1420tax
1430.noirq pla
1440jmp (oldirqv)
1450\
1460.WAIT lda port
1470and #&80
1480cmp image
1490beq WAIT
1500sta image
1510rts
1520\
1530.SET_SEND_MODE lda #&4F
1540sta ddr
1550rts
1560\
1570.SET_RECEIVE_MODE lda #&40
1580sta ddr
1590rts
1600\
1610.WBYTE tax
1620jsr WLNYB
1630jsr SHAKE
1640jsr WAIT
1650jsr WHNYB
1660jsr SHAKE
1670rts
1680\
1690.WLNYB lda port
1700and #&F0
1710sta half
1720txa
1730and #&0F
1740ora half
1750sta port
1760rts
1770\
1780.WHNYB lda port
1790and #&F0
1800sta half
1810txa
1820lsr A
1830lsr A
1840lsr A
1850lsr A
1860and #&0F
1870ora half
1880sta port
1890rts
1900\
1910.SHAKE lda port
1920eor #&40
1930sta port
1940rts
1950\
1960.TRANSMIT jsr SET_SEND_MODE
1970lda port
1980and #&02
1990sta image
2000lda #&02
2010sta half
2020rts
2030\
2040.SEND jsr TRANSMIT
2050jsr GENBBCIRQ
2060jsr WAIT
2070jsr OUTPACKET
2080jsr OUTDATA
2090jsr SET_RECEIVE_MODE
2100rts
2110\
2120.GENBBCIRQ lda pa2
2130ora #&24
2140sta pa2
2150lda pa2
2160and #&F0
2170sta pa2
2180rts
2190\
2200.LDBYTE jsr LDNYB
2210sta half
2220jsr SHAKE
2230jsr WAIT
2240jsr LDNYB
2250asl A
2260asl A
2270asl A
2280asl A
2290ora half
2300pha
2310jsr SHAKE
2320pla
2330rts
2340\
2350.LDNYB lda port
2360and #&0F
2370rts
2380\
2390.RECEIVE lda #&00
2400sta half
2410lda port
2420and #&80
2430sta image
2440jsr SHAKE
2450jsr STDATA
2460rts
2470\
2480.OUTPACKET
2490lda data
2500jsr WBYTE
2510jsr WAIT
2520lda data+1
2530jsr WBYTE
2540jsr WAIT
2550lda len
2560jsr WBYTE
2570jsr WAIT
2580lda len+1
2590jsr WBYTE
2600jsr WAIT
2610lda cmd
2620jsr WBYTE
2630jsr WAIT
2640rts
2650\
2660.OUTDATA ldy #&00
2670lda len+1
2680beq lastwpage
2690.wloop lda (from),Y
2700jsr WBYTE
2710JSR WAIT
2720iny
2730bne wloop
2740dec len+1
2750inc from+1
2760jmp OUTDATA
2770.lastwpage lda len
2780beq endwpage
2790ldy #&00
2800.loop1 lda (from),Y
2810jsr WBYTE
2820JSR WAIT
2830iny
2840cpy len
2850bne loop1
2860.endwpage rts
2870rts
2880\
2890.STDATA
2900jsr WAIT
2910jsr LDBYTE
2920sta data
2930jsr WAIT
2940jsr LDBYTE
2950sta data+1
2960jsr WAIT
2970jsr LDBYTE
2980sta len
2990jsr WAIT
3000jsr LDBYTE
3010sta len+1
3020jsr WAIT
3030jsr LDBYTE
3040sta cmd
3050jsr CHKCMD
3060\
3070.dataloop ldy #&00
3080lda len+1
3090beq lastrpage
3100.rloop jsr WAIT
3110jsr LDBYTE
3120sta (data),Y
3130iny
3140bne rloop
3150dec len+1
3160inc data+1
3170jmp dataloop
3180.lastrpage lda len
3190beq endrpage
3200ldy #&00
3210.loop2 jsr WAIT
3220jsr LDBYTE
3230sta (data),Y
3240iny
3250cpy len
3260bne loop2
3270.endrpage rts
3280\
3290.CHANGE_VECTORS lda #BLODE
MOD 256
3300sta loadv
3310lda #BLODE DIV 256
3320sta loadv+1
3330lda #BSAV MOD 256
3340sta savev
3350lda #BSAV DIV 256
3360sta savev+1
3370rts
3380\
3390.BSAV lda device
3400cmp #&08
3410beq dsave
3420jmp CSAV
3430.dsave ldy flen
3440bne good_name
3450jmp BAD NAME
3460.good_name lda sa
3470sta header
3480jsr SAV MSG
3490ldy #&30
3500sty header+1
3510ldy #&00
3520lda (name),Y
3530cmp #ASC("#")
3540bcs out_range
3550cmp #ASC("0")
3560bcc out_range
3570sta header+1
3580iny
3590lda (name),Y
3600cmp #ASC(":")
3610beq strip_name
3620jmp BAD_NAME
3630.strip_name jsr inc_name
3640jsr inc_name
3650dec flen
3660dec flen
3670.out_range ldy #&00
3680.nloop lda (name),Y
3690sta header+2,Y
3700iny
3710cpy flen
3720bne nloop
3730lda #&0D
3740sta header+2,Y
3750ldx sadd
3760stx header+19
3770ldx sadd+1
3780stx header+20
3790ldx eadd
3800stx header+21
3810ldx eadd+1
3820stx header+22
3830\
3840ldx #&01
```

```
3850stx cmd
3860ldx #header MOD 256
3870stx from
3880ldx #header DIV 256
3890stx from+1
3900sec \ Gen len from eadd and
sadd
3910lda eadd
3920sbc sadd
3930sta len
3940lda eadd+1
3950sbc sadd+1
3960sta len+1
3970inc len+1 \ include header
3980\
3990jsr TRANSMIT
4000jsr GENRACINQ
4010jsr WAIT
4020jsr OUTPACKET
4030lda len
4040pha
4050lda len+1
4060pha
4070lda #&00
4080sta len
4090lda #&01
4100sta len+1
4110jsr OUTDATA
4120\
4130lda sadd
4140sta from
4150lda sadd+1
4160sta from+1
4170pla
4180sta len+1
4190dec len+1
4200pla
4210sta len
4220jsr OUTDATA
4230jsr SET_RECEIVE_MODE
4240\
4250clc
4260rts
4270\
4280.inc_name ldx name
4290inx
4300stx name
4310bne end_inc_name
4320ldx name+1
4330inx
4340stx name+1
4350.end_inc_name rts
4360\
4370.BLODE ldx device
4380cpx #&08
4390beq dload
4400jmp CLODE
4410.dload sta lv
4420cmp #&00
4430beq not_ver
4440jmp NO_FILE
4450.not_ver ldy flen
4460bne good_lname
4470jmp BAD_NAME
4480.good_lname lda sa
4490sta header
4500jsr LD_MSG
4510ldy #&30
4520sty header+1
4530ldy #&00
4540lda (name),Y
4550cmp #ASC('4')
4560bcs out_lrange
4570cmp #ASC("0")
4580bcc out_lrange
4590sta header+1
4600iny
4610lda (name),Y
4620cmp #ASC(":")
4630beq strip_lname
4640jmp BAD_NAME
4650.strip_lname jsr inc_name
4660jsr inc_name
4670dec flen
4680dec flen
4690.out_lrange ldy #&00
4700.nloop2 lda (name),Y
4710sta header+2,Y
4720iny
4730cpy flen
4740bne nloop2
4750lda #&00
4760sta header+2,Y
4770ldx sa
4780beq basic
4790ldx #&00
4800stx header+19
4810stx header+20
4820jmp send_header
4830.basic ldx bstart
4840stx header+19
4850ldx bstart+1
4860stx header+20
4870.send_header ldx #&00
4880stx header+21
4890stx header+22
4900\
4910ldx #&02
4920stx cmd
4930ldx #header MOD 256
4940stx from
4950ldx #header DIV 256
4960stx from+1
4970ldx #&20
4980stx len
4990ldx #&01
5000stx len+1
5010jsr SEND
5020\
5030.lloop ldx cmd
5040cpx #&03
5050bne lloop
5060ldx #&00
5070stx cmd
5080ldx header+21
5090stx sadd
5100ldy header+22
5110sty sadd+1
5120clc
5130rts
5140\
5150.CHKCMD ldx cmd
5160beq not_disk
5170jmp disk
5180.not_disk rts
5190\
5200.disk lda len
5210pha
5220ldx len+1
5230dex
5240txa
5250pha
5260ldx #&00
5270stx len
5280ldx #&01
5290stx len+1
5300ldx #header MOD 256
5310stx data
5320ldx #header DIV 256
5330stx data+1
5340jsr dataloop
5350ldx header+19
5360stx data
5370ldx header+20
5380stx data+1
5390ldx header
5400bne nc
5410ldx bstart
5420stx data
5430ldx bstart+1
5440stx data+1
5450.nc pla
5460sta len+1
5470pla
5480sta len
5490rts
5500]
5510NEXT PASS
5520CALL TRANSFER
5530CALL RESET
5540
5550HIMEM=HIMEM-&0400:CODE=HIME
M
5560irq2v=&206:oldv=&F0:from=&8
0:data=&82:port=&FE60
5570ddr=port+2:pcr=port+12:ifr=
port+13:ier=port+14
5580cmd=&84:len=&85:flag=&87:ha
lf=&88::image=&89:buffer=&90
5590OSBYTE=&FFF4:OSFILE=&FFDD:O
SCLI=&FFF7
5600FOR PASS=0 TO 2 STEP 2
5610P%=CODE
5620[OPT PASS
5630.SETUP sei
5640lda irq2v
5650sta oldv
5660lda irq2v+1
5670sta oldv+1
5680.RESETUP sei
5690lda #(newv MOD 256)
5700sta irq2v
5710lda #(newv DIV 256)
5720sta irq2v+1
5730lda #128+16
5740sta ier
5750cli
5760jsr SET_RECEIVE_MODE
5770rts
5780\
5790.newv lda ifr
5800and #128+16
5810cmp #&00
5820beq finirq
5830sta ifr
5840jsr RECEIVE
5850.finirq jmp (oldv)
5860\
5870.WAIT lda port
5880and #&40
5890cmp image
5900beq WAIT
5910sta image
5920rts
5930\
5940.SET_SEND_MODE lda #&BF
5950sta ddr
5960rts
5970\
5980.SET_RECEIVE_MODE lda #&00
5990sta ddr
6000rts
6010\
6020.WBYTE tax
6030jsr WLNYB
6040jsr SHAKE
6050jsr WAIT
6060jsr WHNYB
6070jsr SHAKE
6080rts
6090\
6100.WLNYB lda port
6110and #&F0
6120sta half
6130txa
6140and #&0F
6150ora half
6160sta port
6170rts
6180\
6190.WHNYB lda port
6200and #&F0
6210sta half
6220txa
6230lsr A
6240lsr A
6250lsr A
6260lsr A
6270and #&0F
6280ora half
6290sta port
6300rts
```

```
6310\
6320.SHAKE lda port
6330eor #&40
6340sta port
6350rts
6360\
6370.OUTPACKET
6380lda data
6390jsr WBYTE
6400jsr WAIT
6410lda data+1
6420jsr WBYTE
6430jsr WAIT
6440lda len
6450jsr WBYTE
6460jsr WAIT
6470lda len+1
6480jsr WBYTE
6490jsr WAIT
6500lda cmd
6510jsr WBYTE
6520jsr WAIT
6530rts
6540\
6550.OUTDATA ldy #&00
6560lda len+1
6570beq lastwpage
6580.wloop lda (from),Y
6590jsr WBYTE
6600JSR WAIT
6610iny
6620bne wloop
6630dec len+1
6640inc from+1
6650jmp OUTDATA
6660.lastwpage lda len
6670beq endwpage
6680ldy #&00
6690.loop1 lda (from),Y
6700jsr WBYTE
6710JSR WAIT
6720iny
6730cpy len
6740bne loop1
6750.endwpage rts
6760rts
6770\
6780.TRANSMIT jsr SET_SEND_MODE
6790lda port
6800and #&40
6810sta image
6820lda #&00
6830sta half
6840rts
6850\
6860.SEND jsr TRANSMIT
6870jsr SEN641RQ
6880jsr WAIT
6890jsr OUTPACKET
6900jsr OUTDATA
6910jsr SET_RECEIVE_MODE
6920rts
6930\
6940.SEN641RQ lda #128+64
6950sta pcr
6960lda #128+64+32
6970sta pcr
6980rts
6990\
7000.LDBYTE jsr LDNYB
7010sta half
7020jsr SHAKE
7030jsr WAIT
7040jsr LDNYB
7050asl A
7060asl A
7070asl A
7080asl A
7090ora half
7100pha
7110jsr SHAKE
7120pla
7130rts
7140\
```

```
7150.LDNYB lda port
7160and #&0F
7170rts
7180\
7190.STDATA
7200jsr WAIT
7210jsr LDBYTE
7220sta data
7230jsr WAIT
7240jsr LDBYTE
7250sta data+1
7260jsr WAIT
7270jsr LDBYTE
7280sta len
7290jsr WAIT
7300jsr LDBYTE
7310sta len+1
7320jsr WAIT
7330jsr LDBYTE
7340sta cmd
7350jsr CHKCMD
7360\
7370lda len
7380pha
7390lda len+1
7400pha
7410.dataloop ldy #&00
7420lda len+1
7430beq lastrpage
7440.rloop jsr WAIT
7450jsr LDBYTE
7460sta (data),Y
7470iny
7480bne rloop
7490dec len+1
7500inc data+1
7510jmp dataloop
7520.lastrpage lda len
7530beq endrpage
7540ldy #&00
7550.loop2 jsr WAIT
7560jsr LDBYTE
7570sta (data),Y
7580iny
7590cpy len
7600bne loop2
7610.endrpage pla
7620sta len+1
7630pla
7640sta len
7650rts
7660\
7670.RECEIVE lda #&00
7680sta half
7690lda port
7700and #&40
7710sta image
7720jsr SHAKE
7730jsr STDATA
7740rts
7750\
7760.CHKCMD ldx cmd
7770beq ok
7780ldx buffer
7790stx data
7800ldx buffer+1
7810stx data+1
7820.ok rts
7830\
7840.DSETUP lda #&83
7850jsr OSBYTE
7860stx buffer
7870sty buffer+1
7880.new_file ldx #&00
7890stx cmd
7900.dloop ldx cmd
7910beq dloop
7920cpx #&01
7930bne not_dsave
7940jsr DSAVE
7950.not_dsave cpx #&02
7960bne not_dload
7970jsr DLOAD
7980.not_dload jmp new_file
```

```
7990\
8000.DSAVE ldx buffer
8010stx fcb+&0A
8020ldx buffer+1
8030stx fcb+&0B
8040sec
8050lda buffer
8060adc len
8070sta fcb+&0E
8080lda buffer+1
8090adc len+1
8100sta fcb+&0F
8110clc
8120lda buffer
8130adc #&02
8140sta fcb
8150lda buffer+1
8160adc #&00
8170sta fcb+&01
8180ldx #fcb MOD 256
8190ldy #fcb DIV 256
8200lda #&00
8210jsr OSFILE
8220rts
8230\
8240.fcb EQUD &0000 \ Filename
8250EQUD &0000 \ Load Address
8260EQUD &8000 \ Execution Addr
ess
8270EQUD &0000 \ Start Address
8280EQUD &0000 \ End Address
8290\
8300.DLOAD clc
8310lda buffer
8320adc #&02
8330sta fcb
8340lda buffer+1
8350adc #&00
8360sta fcb+&01
8370ldy #19
8380lda (buffer),Y
8390sta data
8400iny
8410lda (buffer),Y
8420sta data+1
8430lda buffer
8440sta fcb+&02
8450lda buffer+1
8460sta fcb+&03
8470ldx #&00
8480stx fcb+&06
8490ldy #fcb DIV 256
8500ldx #fcb MOD 256
8510lda #&FF
8520jsr OSFILE
8530\
8540ldx buffer
8550stx from
8560ldx buffer+1
8570stx from+1
8580ldx fcb+&0A
8590stx len
8600ldx fcb+&0B
8610stx len+1
8620ldx #&03
8630stx cmd
8640jsr SEND
8650rts
8660\
8670.DRIVE_NUM ldy #&01
8680lda (buffer),Y
8690sta drive
8700ldx #osl MOD 256
8710ldy #osl DIV 256
8720jsr OSLI
8730rts
8740\
8750.osl EQUS  DRIVE
8760.drive EQUB &00
8770EQUB &0D
8780\
8790]
8800NEXT PASS
8810CALL SETUP
8820CALL DSETUP
```

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Rebound

A superb breakout style game for C16 and Plus/4 owners

By K.M. Lawrence

It's funny how the old favourites like space invaders and breakout are still extremely popular with computer owners

To play the game LOAD the program 'REBOUND' and RUN it This will automatically LOAD and RUN the machine code section of the program

Use a joystick in port one to move your bat and hold down the fire button to make the bat move faster But be careful – you have limited power to do this

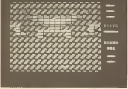
When you hit a brick it may turn into a 'mutant' and flash From this state the brick may return to normal or it may change into a brick that will affect your bat in strange ways The possibilities are small bat reverse controls or fast ball The latter lasts until you hit the ball again while the others last for a certain length of time

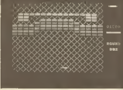
It is possible that when you hit a brick, a white dot may fall towards you If you catch this you get the chance of using one of the various options that will appear on the right of the screen Pull the joystick down to choose the option that you want but remember the more dots that you collect the better the option that is given to you

Options Available

Power Extra power to go fast
Cure – Gets rid of small bat etc
Exit – Go to next level
XBALL Up to three balls on screen push up to release
XLIFE – Up to 255
Wall – Places a wall behind you so that balls will not be lost

When the game starts the screens are set to random order Press RETURN while on the title screen to play the screens in sequence





Getting it all in

Rebound consists of two programmes The first, REBOUND, is in Basic and should be typed into your machine in the normal way and then SAVEd to disk or cassette

The second program REBOUND M/C, needs to be entered through the computers in built monitor To enter the monitor type MONITOR type M 1000 to start entering the program You will now be able to enter each line of the listing over the existing contents of the computer You must press RETURN to enter each line of machine code If you have never used the MONITOR read the relevent section in your computer's manual and be sure that you understand what you're doing before entering the program

It is important to note that your typing must be very accurate The slightest typing error will cause the program not to work

When you have entered all of the REBOUND M/C program you should SAVE it to disk or tape by using the following command

```
S"REBOUND M/C",01 1000 3400
```

If using disk change the 01 to 08 Cassette users should SAVE REBOUND M/C after the program

MONITOR

```
  PC  SR AC XR YR SP
 FFFF 00 FF FF FF F8

>1000 20 5B 22 A9 2F 8D E6 10
>1008 A9 28 8D E7 10 A9 00 8D
>1010 1C 18 A9 03 8D 15 FF 8D
>1018 19 FF A9 93 20 D2 FF A9
>1020 C0 8D 14 FF A9 33 8D 13
>1028 FF AD 07 FF 09 10 8D 07
>1030 FF A9 51 8D 16 FF 20 D2
>1038 12 20 70 23 A9 93 20 D2
>1040 FF AD 25 28 29 01 8D 25
>1048 28 20 91 12 20 51 13 20
>1050 E3 21 20 EE 21 20 01 10
>1058 20 87 1D 20 27 12 20 44
>1060 14 20 44 13 EE 5F 1D EE
>1068 65 1D 20 C9 14 A9 00 8D
>1070 63 1F 20 44 13 A9 00 8D
>1078 15 FF 20 DC 1F 20 BD 14
>1080 20 F0 19 20 1F 15 AD 1E
>1088 15 F0 3D 20 3E 21 20 F3
>1090 1F 20 CD 1D 20 09 1D 20
>1098 06 1B 20 3A 22 20 97 27
>10A0 20 A6 27 AD 07 1B F0 23
>10A8 A9 FE 20 70 D8 29 10 D0
>10B0 C1 AD E6 10 18 69 20 8D
>10B8 E6 10 EE 1C 1B AD E7 10
>10C0 69 00 8D E7 10 4C 12 10
>10C8 4C 31 1E 4C 8D 1E 4C DD
>10D0 24 A9 0C 85 2C A9 00 85
>10D8 28 8D 07 1B AD 25 28 D0
>10E0 ED A2 00 A0 00 80 26 28
>10E8 85 31 86 7F A2 07 BD 66
>10F0 11 CA 1D 66 11 E8 25 31
>10F8 F0 29 85 32 EE 07 1B A9
>1100 3A 91 28 C8 A9 38 91 28
>1108 20 5A 11 A5 32 86 32 E0
>1110 31 F0 03 4A CA 4C 0F 11
>1118 AA BD 6E 11 A6 32 91 2D
>1120 88 91 2D C8 C8 CA CA C0
>1128 08 D0 C3 A5 28 18 69 08
>1130 85 28 A5 2C 69 00 85 2C
>1138 A6 2F A0 00 E6 8A 29 01
>1140 D0 A3 A5 2B 18 69 18 85
>1148 28 A5 2C 69 00 85 2C E0
>1150 20 D0 90 0E 07 1B 4C 72
>1158 11 00 A5 28 85 2D A5 2C
>1160 38 E9 04 85 2E 60 01 02
>1168 04 08 10 20 40 80 00 3A
>1170 3E 6F A9 0C 85 2C A9 0F
>1178 8D 2F A9 00 85 28 A0 0F
>1180 B1 28 AA 20 5A 11 B1 2D
>1188 85 32 84 31 E0 20 F0 1E
>1190 98 19 FF 29 0F 18 69 10
>1198 A5 8A C9 20 30 10 49 FF
>11A0 29 01 18 69 3A 91 28 20
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>30A8 66 66 66 66 66 66 3C 00
>30B0 66 66 66 66 66 3C 18 00
>30B8 63 63 63 6B 7F 77 63 00
>30C0 66 66 3C 18 3C 66 66 00
>30C8 66 66 66 3C 18 18 18 00
>30D0 7E 06 0C 18 30 60 7E 00
>30D8 00 00 00 00 00 00 0A 08
>30E0 00 00 AA 82 82 AA A0 20
>30E8 08 0A AA 82 82 AA 00 00
>30F0 20 A0 00 00 00 00 00 00
>30F8 00 00 00 00 00 00 00 00
>3100 00 00 00 00 00 00 00 00
>3108 18 18 18 18 00 00 18 00
>3110 66 66 66 00 00 00 00 00
>3118 66 66 FF 66 FF 66 66 00
>3120 18 3E 60 3C 06 7C 18 00
>3128 5F F7 FD FD F7 5F 00 00
>3130 F5 DF 7F 7F DF F5 00 00
>3138 06 0C 18 00 00 00 00 00
>3140 0C 18 30 30 30 18 0C 00
>3148 30 18 0C 0C 0C 18 30 00
>3150 00 66 3C FF 3C 66 00 00
>3158 00 18 18 7E 18 18 00 00
>3160 00 00 00 00 00 18 18 30
>3168 00 00 00 7E 00 00 00 00
>3170 00 00 00 00 00 18 18 00
>3178 00 03 06 0C 18 30 60 00
>3180 3C 66 6E 76 66 66 3C 00
>3188 18 18 38 18 18 18 7E 00
>3190 3C 66 06 0C 30 60 7E 00
>3198 3C 66 06 1C 06 66 3C 00
```

```
>31A0 06 0E 1E 66 7F 06 06 00
>31A8 7E 60 7C 06 06 66 3C 00
>31B0 3C 66 60 7C 66 66 3C 00
>31B8 7E 66 0C 18 18 18 18 00
>31C0 3C 66 66 3C 66 66 3C 00
>31C8 3C 66 66 3E 06 66 3C 00
>31D0 FF FF FF FF FF FF 00 00
>31D8 FC FC FC FC FC FC 00 00
>31E0 FF FF DF F7 DF FF 00 00
>31E8 FC DC 7C DC FC FC 00 00
>31F0 FF FF DF 57 DF FF 00 00
>31F8 FC FC 5C FC 5C FC 00 00
>3200 FF FF D5 05 FF FF 00 00
>3208 FF FF 6B 6B FF FF 00 00
>3210 AA A9 A9 A9 A9 A9 00 00
>3218 AA 6A AA 6A AA 6A 00 00
>3220 AA B5 B5 B5 B5 AA 00 00
>3228 AA 5E 5E 5E 5E AA 00 00
>3230 AA A9 A9 A5 A9 AA 00 00
>3238 AA 6A 5A 5A 6A AA 00 00
>3240 AA A5 AA FF FF AA 00 00
>3248 AA 5A AA FF FF AA 00 00
>3250 A0 6A A0 00 6A 7C 66 7E
>3258 26 68 30 60 78 FF 7F FF
>3260 FF 7F FF FF FF FF 00 FF
>3268 F9 5F 7F FF D3 00 68 F8
>3270 F7 6C C8 00 00 58 6E 7E
>3278 E8 FF E8 28 20 E8 DF F8
>3280 F5 F5 F5 F5 00 00 00 00
>3288 55 55 55 55 00 00 00 00
>3290 5F 5F 5F 5F 00 00 00 00
>3298 00 00 FF FF FF FF 00 00
>32A0 00 00 FC FC FC FC 00 00
>32A8 00 00 F0 F0 F0 F0 00 00
>32B0 00 00 C0 C0 C0 C0 00 00
>32B8 16 3C 46 07 CF 56 3C 16
>22C0 FF FF FF FF 9F FF FF FF
>32C8 88 FF FF FF FF FF FF 97
>32D0 FF FF FF FF FF FF FF FF
>32D8 FF FF FF FF FF FF 94 FF
>32E0 FF FF FF FF BF FF 81 B7
>32E8 FF 00 FF FF FF FF 10 FF
>32F0 FF FF FF FF FF FF 82 1F
>32F8 BD 00 AE 00 80 FF 00 FF
>3300 86 DF 02 F5 87 00 00 FF
>3308 FF B4 00 24 00 00 00 00
>3310 00 00 00 00 00 00 00 00
>3318 00 00 00 00 00 00 48 E5
>3320 00 00 20 00 00 00 00 00
>3328 00 C0 00 00 00 00 00 00
>3330 00 00 00 00 00 00 00 00
>3338 00 00 00 00 00 00 00 00
>3340 00 00 00 40 00 00 00 7F
>3348 00 00 00 A0 00 12 00 00
>3350 00 00 00 00 00 00 00 FF
>3358 FF 00 FF FF 00 00 10 FF
>3360 00 00 00 C0 00 00 00 00
>3368 00 C0 00 00 7F 00 00 00
>3370 00 00 00 0C 00 00 FF 00
>3378 00 00 00 00 00 00 00 00
>3380 00 00 00 00 00 00 0A 08
>3388 00 00 AA 82 82 AA A0 20
>3390 08 0A AA 82 82 AA 00 00
>3398 20 A0 00 00 00 00 00 00
>33A0 02 02 0A 08 28 20 A0 80
>33A8 80 80 A0 20 28 08 0A 02
>33B0 80 A0 20 28 08 0A 02 02
>33B8 02 0A 08 28 20 A0 80 80
>33C0 20 28 0A 00 00 0A 28 20
>33C8 08 28 A0 00 00 A0 28 08
>33D0 20 28 0A 00 00 0A 28 20
>33D8 08 28 A0 00 00 A0 28 08
>33E0 00 00 00 00 00 0A 2A 2A
>33E8 00 00 28 82 28 00 80 A0
>33F0 0A 02 00 28 82 28 00 00
>33F8 A8 A8 A0 00 00 00 00 00
>3400 FF FF FF FF FF FF FF FF
```

Hide-It

Keep prying eyes out of your programme with this handy utility

By James R Strang

Hide-It will allow you to protect any Basic programmes that you have produced. It alters a program so that when it is listed only a single line will be shown and this will only contain a SYS number.

Of course Hide It isn't going to stop a determined hacker from breaking into your programmes. It will however deter the casual intruder from listing them.

All of the instructions are printed by the Basic loader program, so you should have no problems using the program.

The machine code version of the program is also reproduced here for anyone who wishes to customize the code. The assembler used to produce the listing is Speedy Assembler which *Your Commodore* is using as a standard for all of its machine code listings.

Getting it all in

You should have no problems entering the Basic loader. The SYNTAX CHECKER program found on the LISTINGS page of this magazine will help check your typing.

As mentioned the machine code version of the program has been produced using *Your Commodore*'s own SPEEDY ASSEMBLER. You should be able to enter this into any assembler with very few changes.

N.B. You only need to type in the Basic loader to use the program. The machine code is reproduced here for those who want to see how the program works.

```
PROGRAM  HIDE-IT

05  100 POKE53280,0 POKE53281,0
4B  110 REM***********************
    ******
02  120 REM*** PROGRAM TO HIDE-I
    T  ***
07  130 REM***********************
    ******
06  140
03  150 REM***********************
    ******
8A  160 REM**      PRESENTED BY
      **
34  170 REM**     JAMES R STRANG
      **
A8  180 REM**       11 08 1985
      **
58  190 REM***********************
    ******
F2  200
56  210 FORB=0TO387 READA POKE49
    152+B A NEXT
D1  219 REM CLR
AA  220 PRINT"[CLR]0SYS2063"
39  230 PRINT"]******************
    *****************************
    **********************
07  235 REM RVS  11*CRD
E4  240 A$="[RVSON DOWN11]LOAD T
    HE PROGRAM THAT IS TO BE PRO
    TECTED"
D2  248 REM RVS-CRU
6C  250 B$="[RVSON,UP]THEN PUT T
    HE CURSOR OVER  LINE 0 AND H
    IT"
B3  255 REM RVS CRU
78  260 C$="[RVSON,UP]THE RETURN
      NOW OVER LINE 1 AND H
    IT"
CF  265 REM RVS-CRU OFF RVS
CD  270 D$="[RVSON UP]THE RETURN
       IF YOU NOW TYPE  [RVSOFF]
     SYS49152 [RVSON]"
7D  275 REM RVS-CRU
D1  280 E$="[RVSON UP]THE PROGRA
    M IS NOW PROTECTED FROM PRYI
    NG"
B7  285 REM RVS CRU
5B  290 F$="[RVSON UP]EYES  NOW
    SAVE PROTECTED PROGRAM [SPC7
    ]"
20  295 REM   2*CRD-  5*CRR-RVS
    OFF
12  300 G$="[DOWN2 RIGHT5 RVSON]
     HAPPY PROGRAMMING [RVSOFF]"
A2  310 PRINTA$ PRINTB$ PRINTC$
    PRINTD$ PRINTE$ PRINTF$ PRIN
    TG$
21  315 REM  17*CRU
EE  320 PRINT"[UP17]LOAD" CHR$(3
    4) "FILENAME" CHR$(34), 8
    NEW
AC  330 DATA 162 0 189,35,192,23
    2 157 14,8 224 67 208 245 16
    9 0 141
9E  340 DATA 11 8 141 12 8 162 0
     189 102 192 32 210,255,232
    224 251
5A  350 DATA 208 245 96 184 48 1
    92 128 16,35 169 155 141 4 1
    28 169 194
30  360 DATA 141 5,128 169 205 1
    41 6 128 169 56 141 7 128 16
    9 48 141
2E  370 DATA 8 128 169 78 141 0
    128 169 8,141 1 128 169 193
    141,24
20  380 DATA 3 169 254,141 25 3
    169 83 133 43 169 234 141 40
     3 32
CC  390 DATA 88 169 76 174 167 0
     16 147,17 29 29 29 29 176,1
    92 192
96  400 DATA 192 192 192 192 192
     192 192 192 192 192 192 192
     192 192 192 192
D2  410 DATA 192 192 192 192 192
     192 192,192 192 192 192 192
     192,174 18 29
A3  420 DATA 29 29 29 29 29 28 2
    21 18 82 75 84 69,67 84 73 7
    9
6E  430 DATA 78 32 83 69,82 86 7
    3 67,69,32,49 57 56,54 32 76

B1  440 DATA 73 77 73 84 69 68 2
    21,18,29 29 29 29 29 29 1
    71
74  450 DATA 192 192 192 192,192
     192 192 192 192,192,192 192
     192 192 192 192
D7  460 DATA 192 192 192 192 192
     192 192 192 192 192 192 192
     192 192 192 173
C0  470 DATA 18 29 29 29 29 29,2
    9,29 221,32 32 80 82 79 71 8
    2
B3  480 DATA 65,77 77 69 32,79 8
    3,32 32,70,79 87,32 80 82 79

51  490 DATA 84 69 67 84 69 68,3
    2 32 221 18 29 29 29 29 29 2
    9
E4  500 DATA 29 173,192 192 192
    192 192 192 192 192 192 192
    192 192 192 192
A0  510 DATA 192 192 192 192 192
     192 192 192 192 192 192,192
     192 192 192 192
24  520 DATA 192 189 146 17 17 1
    7 17 17 17 17 17 17 17 17 17
    17
17  530 DATA 17 17 29 29 29 83 6
    5 80,65 34 78 73 76 69 78 69

CC  540 DATA 77 69 34 44 56 44 4
    5 32,32 32,32 32 32 32 32 32

06  550 DATA 32 0 0 0 0 0 0 0 0
    0 0,0 0,0 0 0
```

FILENAME HIDE IT

```
10        ASSEMBLY SOURCE CODE FOR DATA
20        SECTION OF HIDE-IT
30        BY JAMES R STRAND
40
50                  ORG $C000
60                  LDX #$00
70     LA002        LDA LA001,X
80                  INX
90                  STA $080E,X
100                 CPX #$43
110                 BNE LA002
120                 LDA #$00
130                 STA $080B
140                 STA $080C
150                 LDX #$00
160    ;
170    ; READ IN CHARACTERS FROM BYT
180    ;
190    LA004        LDA LA003,X
200    ;
210    ; OUTPUT TO SCREEN
220
230                 JSR $FFD2
240                 INX
250
260    ; ALL CHARACTERS PRINTED ?
270    ;
280                 CPX #$F8
290                 BNE LA004
300                 RTS
310    LA001        LDY $2E
320                 CPY #$80
330    ;
340    ; SET UP NEW POINTERS
350
360                 BPL LA005
370                 LDA #$C3
380                 STA $8004
390                 LDA #$C2
400                 STA $8005
410                 LDA #$CD
420                 STA $8006
430                 LDA #$38
440                 STA $8007
450                 LDA #$30
460                 STA $8008
470                 LDA #$45
480                 STA $8000
490                 LDA #$08
500                 STA $8001
510    LA005        LDA #$C1
520
530    ; VECTORS FOR NMI  NORMALLY $FE47
540
550                 STA $0318
560                 LDA #$FE
570                 STA $0319
580
590    ; VECTOR START OF BASIC
600    ;
610                 LDA #$53
620
630    ; MOVES BASIC START TO NEW START
640    ; AFTER MACHINE LANGUAGE
650    ;
660                 STA $2B
670                 LDA #$EA
680                 STA $032B
690    ;
700    ; CLEAR SET POINTERS
710
720                 JSR $C458
730
740    ; BUNG FROM START
750
760                 JMP $A7AE
770                 BRK
780    LA003        BYT 18 147 17
790                 BYT 29 29 29 29
800                 BYT
810                 BYT  -     -  --
820                 BYT
830                 BYT 18 29 29 29 29 28
840                 BYT 29 29
850                 BYT  (PROTECTION
860                 BYT  SERVICE 1986
870                 BYT "LIMITED
880                 BYT 18 29 29 29 29 29
890                 BYT 29 29
900                 BYT " ----     ---
910                 BYT    -- -     -
920                 BYT   -------|
930                 BYT 18 29 29,29 29,29
940                 BYT 29 29
950                 BYT "   PROGRAMME IS "
960                 BYT " NOW PROTECTED  !"
970                 BYT 18 29 29 29 29,29
980                 BYT 29 29
990                 BYT "-------------"
1000                BYT "-------------
1010                BYT "-------------
1020                BYT 146 17 17 17 17 17
1030                BYT 17 17 17 17 17
1040                BYT 17 17 17 17 17
1050                BYT 29 29 29  SAVE"
1060                BYT $22 "FILENAME"
1070                BYT $22   8 1"
1080                BYT "
1090      10 SPACES IN ABOVE LINE
```

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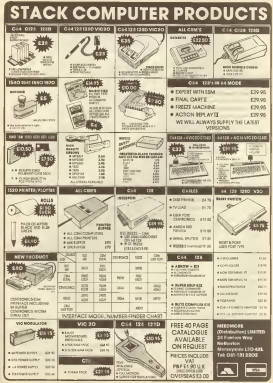

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Programmes on the disk will also be supplied as totally working versions, i e when possible we will not use Basic Loaders thus making use of the programmes much easier Unfortunately at the moment we cannot duplicate C16 and Plus/4 cassettes However programmes for these machines will be available on the disk

What programmes are available?

At the top of each article you will find a strap containing the article type C64 Program etc So that you can see which programmes are available on which format you will also find a couple of symbols after this strap The symbols have the following meaning

📼

This symbol means that the program is available on cassette

💾

These programs are available on disk

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Tech Troubles

If you have any technical problems, write to our agony uncle, Tim Arnot who will do his best to help

By Tim Arnot

Dear Tim,
I have a Commodore 128 and 1571 disk drive. After what I've heard recently, just how safe is it to use the back of the disk, especially with programmes like Superbase?
Raymond North, Blackpool

Hi Raymond
The 1571 has certainly received its fair share of criticism over the past few months. In essence, the problem with it is that under certain circumstances, files that use the second side of the disk can become trashed. This trashing will ONLY occur under the following specific conditions.

Either one RELative file and one SEQuential file is open or three SEQuential files are open. Of course one of those files must be on side two!

What happens to your newly opened file on side two is basically this. After 1000 or so bytes have been written to the file, corruption of data WILL occur. The resulting file will contain only up to seven blocks of data regardless of how much was written. If you then COLLECT (validate) the disk, the block count no longer adds up to 1328.

ICPUG member Greg Perry from Australia recently provided the following program which demonstrates the problem.

```
PROGRAM  1571 BUG DEMO

100 REM *** DEMO OF 1571 BUG ***
110 REM *** CREATE RELATIVE FILE
 TO FILL SIDE 1 ***
120 DOPEN#2,"MAIN FILE",L254 GOS
UB 420
130 PRINT "PLEASE WAIT - CREATIN
G RELATIVE FILE"
140 RN=710 GOSUB 390 REM POSITIO
N RECORD
150 PRINT#2,"END RECORD"
160 REM *** WRITE SOME RECORDS T
O FILE ***
170 FOR RN=1 TO 40
180 PRINT "WRITING RECORD #" RN
190 GOSUB 390 REM POSITION RECOR
D
200 PRINT#2,"THIS IS RECORD #",R
N
210 NEXT RN DCLOSE
220 REM *** DEMONSTRATION OF ERR
OR ***
230 DOPEN#3 "BAD FILE SIDE 2" W
240 IF DS=63 THEN DCLOSE SCRATCH
 "BAD" GOSUB 420 GOTO 230
250 DOPEN#2,"MAIN FILE"
260 FOR RN=1 TO 40
270 PRINT "READING RECORD #" RN
280 GOSUB 390 REM POSITION RECOR
D
290 REM *** READ FROM REL FILE A
ND WRITE TO SEQ FILE ***
300 INPUT#2 A$ PRINT A$
310 PRINT#3 "THIS IS A COPY OF R
ECORD #" RN, "-" A$
320 NEXT RN DCLOSE
330 REM *** NOW READ BACK THE ME
SS WE CREATED ***
340 DOPEN#2 "BAD FILE SIDE 2"
350 I=0 DO UNTIL ST<>0 I=I+1
360 INPUT#2 A$ PRINT I A$
370 LOOP DCLOSE END
380 REM *** POSITION RELATIVE FI
LE ***
390 RECORD#2,(RN) GOSUB 420
400 RECORD#2,(RN)
410 REM *** CHECK DISK ERROR ***
420 IF DS<20 OR DS=50 THEN RETUR
N
430 PRINT "DISK ERROR" DS$
440 DCLOSE END
```

Run the program on a newly formatted disk. A relative file is set up, filling all of side one and part of side two. The first 40 records are then written. To demonstrate the bug, we open a SEQuential file and copy the contents of the first 40 records into it. The resulting file is corrupt. You will see that most of the information we copied is missing. If you COPY "BADFILE SIDE 2" TO "ANOTHER" you will see something curious – the file is now only two blocks long!

This problem will occur with Superbase, and any other application that has more than one file open at once. Program loading and saving is perfectly alright, as there is only one file open. Keeping to side one is also perfectly safe.

There are new ROMs on the way, but they have been held up by the release of the new 128D. Commodore should be able to supply them 'real soon now' (!) so if in doubt, hassle them. The cost is yet to be announced.

Dear Tim,
I own an old 4032 PET and 4040 disk drive. I recently bought a Plus /4 and 1551 disk drive. My problem is this. If I save a program on the PET I can load it on the Plus/4, but if I save it on the Plus/4 I can't load it back on the PET.
Can you help me?
James McHenery, Aberdeen

Hi James
The reason for this is that the LOAD command behaves slightly differently on the PET compared with the later Commodore computers. On the Plus /4 (or C64, C128 etc) when you type LOAD "ANYPROG",8 the program is loaded into memory, starting at a place known as the 'start of Basic'. This is the place where Basic programmes are stored, and it varies from machine to machine. For instance, on the PET it is $0401, on the 64 it is $0801, the 128 is $1C01 and on the Plus/4 it is $1001.

Additionally, the 128 and Plus/4

will move the start of Basic up to $4001 if a high resolution graphics bitmap screen has been created (the $ signs indicate the addresses are in hexadecimal or base 16).

The important thing to grasp is that these computers will always load to the start of Basic no matter where it is. The PET LOAD command is different in that it loads to the absolute address from which the program was saved in the case of the Plus /4 $1001. (If you enter the PET's monitor by typing SYS 4 you can see the program using the command M 1000 2000, which will display the relevant portion of memory.)

In fact, LOAD "ANYPROG",8 on the PET is exactly equivalent to LOAD "ANYPROG",8,1 on the Plus/4. In order to see a Plus/4 program on a PET you will have to move the start of Basic up to $1001. This can be achieved by typing POKE40,1: POKE 41,16: NEW before loading the program. An alternative if you have access to a disk monitor is to change the first two bytes of the program file to $01 04.

Dear Tim,
I am moving to America in the near future and I have a Commodore 64, and want to take it with me. Because the voltages are different I know I will have to buy a new power pack but is it alright to plug the 64 into a TV?
Keith Harrison, Kidderminster

Hi Keith
The short answer to your question is no. You are correct in saying that the mains supply is different – here we have 240 volts at 50 Hz, and in America they have 110 volts at Hz. Thus if you try to plug your 64 in it will not work. However a suitable transformer could be bought out there.

The essential problem is one of TV standards. Even if you could get the 64 to function, American TV sets simply do not like the sort of signals that British TV sets thrive on. I will explain.

In Europe (except France), we use a TV standard known as PAL (Phase Alternate Line). This sends a little dot of light across the screen 625 times, each crossing slightly below the last until it reaches the bottom. This is known as scanning, and the little dot is called a raster. Each complete scan of the picture is completed in 1/50 second. Thus our TV sets receive 50 complete pictures in a second (actually, that is a slight simplification, but it will do).

In America, (and Russia) they use a system called NTSC (North American Television Standards Committee or better known as Never Twice the Same Colour – if you've ever seen American sit-coms you'll know why!). This only has 525 lines in each picture and the pictures are transmitted 60 times per second. There are also other differences to do with things like phase but that gets complicated.

Thus, your 64 puts out 625 line PAL and your TV will want 525 line NTSC, and ne'er the twain shall meet. Of course it is possible to convert one to the other, but on a conservative estimate, a box to do that will cost something over ten grand. Sell your 64 and buy another out there. It's cheaper and much less hassle!

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Instead of those nasty graphics and rows of countless spaces in PRINT statements and strings we use a special coding system. The code, or mnemonic, is always contained in square brackets and you'll soon learn to decipher their meanings.

For example [SA] would mean type in a Shifted A, or an ace of spades in layman's terms, and [SA10] would mean a row of ten of these symbols.

[S+2] means hold down the shift key and press the plus key twice. It doesn't take a great leap of logic to realise that [C+2] means exactly the same thing except that the Commodore key (bottom left of the keyboard) is held down instead of the shift key.

If more than two spaces appear in a statement then this will be printed as [SPC4] or, exceptionally, [SSPC4]. Translated into English this means press the spacebar four times or in the latter case hold the shift key down while you do it.

A string of special characters could appear as
[CTRL N, DOWN2,LEFT5,BLUE, F3,C3]

This would be achieved by holding down the CTRL key as you press N, press the cursor key down twice, the cursor left key five times, press the key marked BLUE while holding down the CTRL key, press the F3 key and, finally hold the Commodore key down while pressing the number two key (C2 would of course make the computer print in brown).

Always remember that you should only have a row of graphics characters on your screen with no square brackets and no commas, unless something like this appears
[SS] [C*]

In this case the two characters should have a comma between them.

On rare occasions [REV T] will appear in a listing. This is a delete symbol and is created by entering the line up to this mnemonic. Then type a closing quotation mark (SHIFT & 2) and delete it. This gets the computer out of quotes mode. Hold down CTRL and press the number nine key (RVSON), type the relevant number of reversed T's and then hold down CTRL and press zero (RVSOFF). Next type another quotation mark and delete it again. Now finish the line and press RETURN.

A list of these special cases is given in the table but remember that only one of these mnemonics will appear outside of a PRINT string the symbol for pi. This may appear when its value is needed in a calculation so this may look something like

CC=2*[PI]*R

Ignore the square brackets and just type in a shifted upward pointing arrow (ie. the pi symbol).

```
PROGRAM SYNTAX CHECKER

5 REM SYTAX CHECKER   ERIC DOYLE

10 BL=10   LN=70   SA=49152
20 FOR L=0 TO BL CX=0 FOR D=0 TO
 15
30 READ A IF A>255THENPRINT"NUMB
ER TO LARGE LN+(L*10) STOP
40 CX=CX+A POKE SA+L*16+D,A NEXT
 D
50 READ A IF A<>CX THENPRINT"ERR
OR IN LINE LN+(L*10) STOP
60 NEXT L SYS 49152 NEW
70 DATA 173 5 3 201 165 208 31 1
80 165 5 141 38 208 141 33 208 1
847
80 DATA 169 7 141 134 2 169 13 3
2 210 255 169 64 141 4 3 169 164
2
90 DATA 192 141 5 3 88 96 120 18
3 124 141 4 3 169 155 141 5 1696

100 DATA 3 165 14 141 134 2 141
32 208 169 8 141 33 208 88 96 15
65
110 DATA 32 124 165 72 136 72 15
2 72 162 0 165 20 133 254 165 21
 1747
120 DATA 24 101 254 133 254 165
0 2 240 18 69 254 133 254 232 16
5 2346
130 DATA 0 2 240 8 24 101 254 13
3 254 232 208 233 169 1 141 134
2134
140 DATA 2 165 254 74 74 74 74 3
2 156 192 32 210 255 165 254 41
2064
150 DATA 15 32 156 192 32 210 25
5 169 13 32 210,255 165 13 32 21
0 1595
160 DATA 255 169 7 141 134 2 104
 168 104 170 104 56 24 105 48 20
1,1632
170 DATA 58 16 1 56 24 105 7 96
0 0 0 0 0 0 0 0 403
```

by Eric Doyle

Checksum Program

The hexadecimal numbers appearing in a column to the left of the listing should not be typed in with the program. These are merely checksum values and are there to help you get each line right. Don't worry if you don't understand the hexadecimal system, as long as you can compare two characters on the screen with the corresponding two characters in the magazine you can use our line checking program.

Type in the Checksum Program, make sure that you've not made any mistakes and save it to tape or disk immediately because it will be used with most of the present and future listings appearing in Your Commodore.

At the start of each programming session, load Checksum and run it. The screen will turn brown with yellow characters and each time you type in a line and press the RETURN key a number will appear on the screen in white. This should be the same as the corresponding value in the magazine.

If the two values don't relate to one another you have not copied the line exactly as printed so go back and check each character carefully. When you find the error simply correct it and press RETURN again.

If you want to turn off the checker simply type SYS49152 and the screen will return to the familiar blue colours. You can then do whatever it was you wanted to do and if this doesn't use the area where Checksum lies you can go back to it with the same SYS command.

No system is foolproof but the chances of two errors cancelling one another out are so remote that we believe our listings are more reliable than any other magazine in the world. So get typing! YC

Mnemonic	Symbol	Keypress
[RIGHT]	▨	CRSR left/right
[LEFT]	▨	SHIFT & CRSR left/right
[DOWN]	▨	CRSR up/down
[UP]	▨	SHIFT & CRSR up/down
[F1]	▨	f1 key
[F2]	▨	SHIFT & f1 key
[F3]	▨	f3 key
[F4]	▨	SHIFT & f3 key
[F5]	▨	f5 key
[F6]	▨	SHIFT & f5 key
[F7]	▨	f7 key
[F8]	▨	SHIFT & f7 key
[HOME]	▨	CLR/HOME
[CLR]	▨	SHIFT & CLR/HOME
[RVSON]	▨	CTRL & 9
[RVSOFF]	▨	CTRL & 0

Mnemonic	Symbol	Keypress
[BLACK]	▨	CTRL & 1
[WHITE]	▨	CTRL & 2
[RED]	▨	CTRL & 3
[CYAN]	▨	CTRL & 4
[PURPLE]	▨	CTRL & 5
[GREEN]	▨	CTRL & 6
[BLUE]	▨	CTRL & 7
[YELLOW]	▨	CTRL & 8
[POUND]		£
[LARROW]		←
[UPARROW]		↑
[PI]		SHIFT & ↑
[INST]		SHIFT & INST/DEL
[REV T]		see text
[Cletter]		CBM + letter
[Sletter]		SHIFT + letter

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29th September

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Further the advertiser indemnifies the proprietors of this magazine in respect of costs, damages or any other claims brought against them as a result of legal action arising from the publication of the advertisement.

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C16 Sprite

There are no problems with this program as printed A number of people have queried how they should enter the [255] statements that appear in some of the lines of the DEMO program When our printer can t reproduce a Commodore graphic either a mnemonic such as [LEFT] is printed or the code of the character is printed within square brackets In this case the character should be looked up in your manual and entered In the case of the [255] the character that should be entered is the PI figure (π)

Software for Sale Important Notice

A number of people have reported an error when LOADing drawings that have been SAVEd using the TEC DRAW 64 program

It appears that a master copy became corrupted and has caused these problems

Should your copy of the program suffer from this problem please return your disk to

OMEGA MICRO SERVICES
7 GRAHAM AVENUE
BRINSWORTH
ROTHERHAM
S60 5LA

and a new disk will be sent by return post Sorry for any inconvenience caused

Apologies are also due to people who experienced delays with software ordered in late June/early July Unfortunately problems were caused by problems with the postal service within London

Fist

Are you a winner in the Exploding Fist competition from April 1987? Read on and find out

Craig Smith Faringdon John Trower Horsham Michael Hall Basingstoke Richard Garfield Rochdale, James Laidlaw Lincoln Perry Green Ealing, Iltkhar Din Nottingham Mark Jaycocks, Herne Bay Mark Woodhouse Nottingham Eric Neill Ballykelly, Mark Kay Leicester Mark Eades Bingley Ian Ashworth Chorley, Neil A Sarbutt Basingstoke, Leanne Piper Hull, G W Jesshop, London The Jolly Bodger, Edinburgh Paul Kennings Birmingham Keith Lewis Bromley Daniel Austen, Anglesey, R Jones, Barnsley Jason Main South Shields, Wayne Dribben Upminster Mark Cornwall Milton Keynes Thomas Branton Thamesmead, W R Austin Plymouth, John Sims Edmonton M Elswood Crewkerne Anthony Roberts London Patrick Putnam Chingford P Aland Bristol B Wadher Thornton Heath Bao Minh Nhan Scarborough Chris Garbutt Basildon M Forrest Watford J Heathcote, Warrington C Hawkins Bracknell G Higgins, Stevenage Perry Green Ealing Richard Wallis Canterbury Michael Williams Caernarfon John Campbell Guernsey, David Marin Salford K Kelsall, Stevenage Pia Dalsfeldt Denmark Junior Hall Nottingham Brian Nicholls Stoke On-Trent Kevin Scarfe Bordon, T Dutton Biggin Hill Louise Wells, Isleworth

Bug Finder

We'd like to remind our readers that we run a Bug Finder service

If you have typed in one of our programmes and despite much checking you still can't get it to run then send us the following

Two copies of your program on tape or disk
A description of your problem
If possible a listing of your work (you may omit this)
A stamped self addressed envelope for return of the program to you

Should any of the above be missing then we will not be able to deal with your query

We will try to point out where you have made errors and place a corrected copy of the program back on to your tape or disk before we return it to you

Do not send a program to us as soon as it stops working please check it several times first

We do get a large number of queries and so it may take a while for us to deal with yours personally

Note we can only deal with problems relating to programmes published in *Your Commodore*

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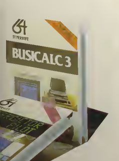

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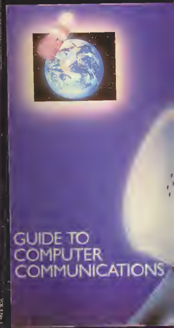

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